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ABSTRACT

MATHCO is a motivating series of audiovisual and print materials designed to overcome the negative effects of sex bias and stereotyping on the attitudes, interests, and aspirations of girls toward mathematics and mathematics-related careers. The materials teach mathematics skills, demonstrate relationships between mathematics and other subjects, and provide exposure to mathematics-related careers. They are useful for boys as well as girls at the pre- and early-adolescent stage; they are both multiethnic and nonsexist in text and illustrations. Module 3 includes a filmstrip and 16 activities linking mathematical concepts and the social sciences. Surveying, planning a trip, scale drawing, population growth, and the stock market are among the topics considered, with activity worksheets for each. (MNS)

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MATHCO

University of Oklahoma
Southwest Center for Human Relations Studies
Norman, Oklahoma

Women's Educational Equity Act Program
U.S. Department of Education

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MATHCO TEACHER'S GUIDE

MODULE 3

Math in Your World

(Math and Social Sciences)

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WOMEN'S EDUCATIONAL EQUITY ACT PROGRAM
U.S. DEPARTMENT OF EDUCATION

T. H. Bell, Secretary

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The activity which is the subject of this report was produced under a grant from the U.S. Department of Education, under the auspices of the Women's Educational Equity Act. Opinions expressed herein do not necessarily reflect the position or policy of the Department, and no official endorsement should be inferred.

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Newton, Massachusetts 02160

STATEMENT OF ENDORSEMENT

The National Review Board has carefully examined and heartily endorses MATHCO as a high-quality and motivating series of audiovisual and print materials designed to overcome the negative effects of sex bias and stereotyping on the attitudes, interests, and aspirations of girls toward mathematics and math-related careers.

These materials have been designed to teach math skills, demonstrate interrelationships between math and other subjects, and provide exposure to a wide variety of math-related careers. These informational and skill-building activities are valuable for boys as well as girls and are both multiethnic and nonsexist in text and illustrations.

We believe that the use of these materials with pre- and early-adolescent students can help to alleviate the math anxiety and avoidance that are characteristic of girls at these ages, resulting in their disproportionately small numbers in high-level mathematics courses and math-related careers.

Over the past two years, the Board has provided advice and assistance to the MATHCO staff as it has conceived, developed, and validated these materials. We are confident that our enthusiasm for this project will be shared by educators throughout the country.

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MODULE 3 OVERVIEW

A 15½-minute sound filmstrip, "Math in Your World," introduces Module 3 to students. Written for the most part by middle school youngsters, the filmstrip revolves around a series of amusing skits that anticipate the MATHCO activities comprising this module. Each skit features an exaggerated or "fantastical" situation that illustrates a mathematical concept that will later be explored in a corresponding Module 3 activity. This presentation encourages students to think about the question "How much math is there in your world?"

Sixteen activities linking mathematical concepts and the social sciences are included in this module. They are as follows:

1. Survey
2. Time Line
3. Planning a Trip
4. Flowchart
5. Electoral College
6. Allotted Classroom Area
7. Scale Drawing: Dream House
8. Globes versus Flat Maps
9. Surveying Device
10. Binary Computer
11. Commercials on Television
12. Superstar Contest
13. Navigation
14. Population Growth
15. Stock Market
16. Shopping at the Stock Market

Each of these activities is structured to stand alone, and may be covered with students in any order desired, with one exception. Activity 15, Stock Market, sets the stage for the mock investment activity explored in Activity 16, Shopping at the Stock Market.

After students have viewed the Module 3 audiovisual, the teacher should select from Module 3 those activities that are best suited and most appropriate to his or her group of students. Some activities may be selected because they relate to the interests of the students. Others will be selected because they deal with math skills with which the students are currently working, review math skills the students should know, and/or present interdisciplinary relationships that will enhance students' appreciation for the study of mathematics.

MODULE 3 AUDIOVISUAL SCRIPT

MATH IN YOUR WORLD
(Math and Social Sciences)

VISUAL	AUDIO
Begin audio with black frame following focus frame.	(Music)
Frame 1 - (TITLE FRAME) Math in Your World	MATHCO presents: Math in Your World
Frame 2 - Pictured is a world map drawn on a grapefruit.	In MATHCO Module 3, you and your classmates will have an opportunity to . . . draw a map on a grapefruit? (incredulous voice)
Frame 3 - Pictured are binary computer cards, a flowchart, and a world map drawn on a grapefruit.	. . . design a flowchart (flowcharts are used in writing programs for computers); . . . design your very own binary computer by using an index card;
Frame 4 - Pictured are a map, binary computer cards, a flowchart, and a world map (globe) drawn on a grapefruit.	. . . compare the difference in accuracy of flat maps and globes;
Frame 5 - Stock market chart from newspaper.	. . . and you may elect to do a little trading on the stock market.
Frame 6 - The various characters who will be taking part in the following skits are shown as a group.	In the following skits, which were written by students your own age, you will get a preview of some of the many ways in which you will use math in this module.

VISUAL	AUDIO
Frame 7 - (TITLE FRAME) How Typical!	How Typical!
Frame 8 - Ernestine is shown dressed in a very unique and atypical manner.	ERNESTINE: Hi! My name is Ernestine Dupree Astrocommentary. I am the most typical student in the whole school. Everyone likes me and I am the greatest!
Frame 9 - Three very average-looking middle school students are shown.	BOY (VOICE #1): Who's that kid? GIRL (VOICE #2): I don't know. I've never seen her before. BOY (VOICE #3): Where did she come from?
Frame 10 - Ernestine is shown holding a plate running over with her mushroom concoction.	ERNESTINE: My favorite food is sauteed mushrooms with liver and maple syrup on top. Everyone else that I know just loves it, too.
Frame 11 - The three average students are shown reacting to Ernestine's mushroom platter.	VOICE #2: Are you kidding? VOICE #3: What ever happened to pizza and plain old cheeseburgers? VOICE #1: . . . and fried chicken and french fries?
Frame 12 - Ernestine is shown holding her favorite beverage as the other three students look on.	ERNESTINE: My favorite drink is one that is very popular. It is Kool-Aid mixed with marshmallows and salt . . . without any sugar. VOICE #1: What about Coke? VOICE #2: Milkshakes? VOICE #1: Malts? VOICE #2: How about root beer?

VISUAL	AUDIO
Frame 13 - Ernestine is shown thumbing through *TV Guide* as the other three students look on.	ERNESTINE: My favorite TV shows are "Captain Kangaroo" and "Face the Nation." VOICE #1: Are you for real? VOICE #2: What about "American Bandstand"? VOICE #3: Or "Soul Train"? VOICE #1: Are you *sure* she goes to *this* school?
Frame 14 - Photo of student survey sheet from Module 3 activities.	NARRATOR: Surveys help us discover all kinds of information. In this activity, you will find out what the most typical student in *your* class is really like.
Frame 15 - (TITLE FRAME) On the Presidential Campaign Trail	On the Presidential Campaign Trail
Frame 16 - An announcer is shown at the presidential campaign rally podium.	NARRATOR: Here we are at the 1988 presidential campaign rally! Meet our two candidates . . .
Frame 17 - Clara Candidate is shown covered with campaign buttons and banners.	NARRATOR: . . . Clara Candidate! CLARA: That's me! (applause and cheering)
Frame 18 - Ellen Election is shown holding an "Elect Ellen" banner.	NARRATOR: . . . and Ellen Election! ELLEN: Win with Ellen! Elect me as your next President! (applause and cheering)

VISUAL	AUDIO
Frame 19 - Clara and her campaign manager are shown discussing their campaign strategy.	NARRATOR: And now, let's see what our candidates for office are up to. CLARA: Otty, since you're my campaign manager, let me be the first to tell you that I plan to campaign hardest in Wyoming, Nevada, and Delaware. They are my favorite states.
Frame 20 - Wyoming, Nevada, and Delaware are shaded in red on a map of the United States.	OTTY: But, Clara, those three states don't have many electoral votes. CLARA: Otty, *I'm* the candidate, and I'll make the decisions. OTTY: OK, Clara, if you insist.
Frame 21 - Ellen and her campaign manager, Eddie, are shown discussing their campaign strategy.	ELLEN: As for me, I've been making a chart of the electoral votes that each state has. Eddie, I've decided to campaign hardest in New York, California, and Texas. These states have *loads* of electoral votes.
Frame 22 - New York, California, and Texas are shaded in black on a map of the United States.	EDDIE: Ellen, as your campaign manager, I do understand your plan. You're a *very* smart candidate.
Frame 23 - Ellen Election is shown accepting the cheers of her supporters.	NARRATOR: Three months later . . . and our new President is . . . Ellen Election! (applause and cheering)

VISUAL	AUDIO
Frame 24 - A distressed Clara and her campaign manager, Otty, are shown discussing the outcome of the election.	OTTY: Clara, you really goofed! Nevada, Wyoming, and Delaware only have nine electoral votes between them. Ellen Election campaigned in New York, California, and Texas because they have a total of 112 electoral votes.
Frame 25 - Wyoming, Nevada, and Delaware are shaded in red, and New York, California, and Texas are shaded in black on a map of the United States.	CLARA: Nevada, Wyoming, and Delaware equaled nine electoral votes. (Sadly) New York, California, and Texas equaled 112 electoral votes. NARRATOR: Few people know how important electoral votes are unless they are candidates who depend on these votes to win national elections. You'll discover just how important electoral votes are when you do this activity.
Frame 26 - (TITLE FRAME) The Eighth Wonder of the World	The 8th Wonder of the World
Frame 27 - A very proud Artie Architect is shown explaining his creation to his clients.	ARCHITECT: Here's my sketch of the new house that I, Artie Architect, drew up for your new home. You will notice that it has an indoor and outdoor swimming pool, a ski jump, a bowling alley, a tiddlywinks room, a sauna, a movie projection room, a roller-skating rink, and an ice-skating rink. Why, when built, this house will be the eighth wonder of the world!

VISUAL	AUDIO
Frame 28 - A husband and wife are shown examining Artie's plans for their new home.	WOMAN: That's very interesting, Artie. But where is my study, and our living room, dining room, and bedrooms? MAN: And do you notice that there aren't any windows, doors, or closets . . . not to mention a kitchen or a bathroom in your plan, Artie?
Frame 29 - Artie is shown trying to defend his house plans to his clients.	ARCHITECT: Irrelevant and unnecessary! They would only clutter up my masterpiece!
Frame 30 - Artie Architect and his clients continue their discussion	WOMAN: But this is supposed to be our *home* . . . MAN: Yes, yes . . . not an amusement park! WOMAN: Did you listen when we told you what we wanted in our house?
Frame 31 - Artie Architect and his clients continue their discussion.	ARCHITECT: Sure. But all Hollywood stars have projection rooms. MAN: But we're not Hollywood stars! Where is the scale drawing of our house, Artie? You know, the one that showed the bedroom, kitchen, living room, dining room, the front and back doors, and the windows. WOMAN: We don't need all of those extravagant rooms you added on.
Frame 32 - A distressed Artie is forced to accept the inevitable.	ARCHITECT (sighing): Well, OK. But I still think it would have been the eighth wonder of the world. Are you *sure* you don't need a tiddlywinks room?

VISUAL	AUDIO
Frame 33 - A scale drawing of a normal house is shown.	NARRATOR: Making scale drawings of floor plans is very important to avoid making mistakes in building. In this activity, you will use this skill to design your very own dream house.
Frame 34 - (TITLE FRAME) A Timely Story	A Timely Story
Frame 35 - Sue and Sam Jones are shown in their backyard holding a piece of paper.	NARRATOR: One day, while playing soccer in the backyard, Sue and Sam Jones found a strange note buried in the dirt. It read: Call me at ECHO-LAB at 4 p.m. today.
Frame 36 - After reading the note, Sue and Sam decide to make the telephone call.	SAM: Wow! Should we call? SUE: Sure. It's ten 'til four now. We'd better go in and get ready to make the call. SAM: Right.
Frame 37 - Sue and Sam are shown making the telephone call to ECHO-LAB.	NARRATOR: Later . . . SUE: Let's see: E-C-H-O-L-A-B. (sounds of a telephone being dialed; sounds of a telephone ringing)
Frame 38 - Sue and Sam are shown talking to a computer.	COMPUTER (speaking in monotone--with echoes): Hello, there. Are you the person who found the note? SUE: Yes. Sam and I found it. COMPUTER: Measure 37 degrees northeast of the old oak, walk 12½ feet in that direction, and you'll walk into a time warp. (sound of a telephone being hung up)

VISUAL	AUDIO
Frame 38 (continued)	SUE: Hey! What? Hey, wait! We've been disconnected. Hey, Sam, let's try it. We could move into a time warp.
Frame 39 - Sue and Sam are shown discussing the situation and making plans.	SAM: We'll make a surveying device. SUE: What? SAM: An instrument used for measuring angles and estimating the position of something. NARRATOR: One hour later . . . SAM: It's done!
Frame 40 - Sue and Sam are shown standing by an old oak tree looking through the surveying device they have made.	SUE: Let's follow the directions. Let's see . . . the old oak . . . 37 degrees northeast . . . 12½ feet . . . it should be right . . . SAM: Here!
Frame 41 - Sue and Sam are shown disappearing into a time warp.	NARRATOR: They both disappeared into the time warp and came back the next Tuesday. They had a wonderful time, thanks to their surveying device. In this activity, you will make a simple surveying device and use it to plot degrees and distances on a map.
Frame 42 - (TITLE FRAME) The Commercial Monster	The Commercial Monster
Frame 43 - A talking television set is shown doing a commercial for Super Liquid.	TELEVISION: . . . and that's why you should drink, eat, spray, and play with Super Liquid.

VISUAL	AUDIO
Frame 44 - A boy is shown talking to the television set.	BOY: This is the 89th commercial I've watched during this 30-minute show! TELEVISION: Too bad, kiddie. BOY: Commercials, commercials, commercials. I can't stand it any more!
Frame 45 - The television set (which is holding an Emily Award) is shown talking to the boy.	TELEVISION: Tough luck! Why, next season we are going to list the commercials as well as the TV programs in the TV Guide. Mr. Rogers will be replaced by Mr. Clean . . . and the Muppets will be replaced by the Job Squad. The TV executives are even planning a special awards show for commercials, called the Emily Awards.
Frame 46 - The talking television set is shown chatting animatedly with the boy.	TELEVISION: We're hoping that soon we'll only be taking 30-second breaks for the TV program. While "The Muppet Show" is on, you can run to the kitchen and get some Dr Pepper to drink while you are watching the "I'm a Pepper Show"!
Frame 47 - While the television set tries to stop him, the boy begins pulling the plug.	BOY: Ah-h-h-h-h-h-h-h-h. TELEVISION: Oh, no! No! No! Oh, please don't pull the plu-u-!
Frame 48 - The boy is shown standing smugly by the television set that he has just turned off.	NARRATOR: How much of the TV you watch is devoted to the program? How much to commercials? You might be surprised to find the answers to these questions as your class does this activity.

VISUAL	AUDIO
Frame 49 - (TITLE FRAME) Super Puppet	Super Puppet
Frame 50 - Announcer Janelle Kennedine is shown at the site of the Super Puppet Contest.	JANELLE: This is Janelle Kennedine at the Puppets' Superstar Contest. In the Bubble Gum Bubble Blowing Contest, three contestants are tied going into this event.
Frame 51 - Hermit the Frog, Miss Porky, and Fuzzy Bear are shown warming up for the Bubble Gum Bubble Blowing Contest.	JANELLE: Hermit the Frog, Miss Porky, and Fuzzy Bear must each do their best. This is going to be a very exciting contest. They've started blowing their warm-up bubbles. There goes the signal and they're off puffing.
Frame 52 - Fuzzy Bear is shown with bubble gum almost covering his face.	JANELLE: Fuzzy blows the first bubble, and it breaks at 9.4 centimeters. How deflating!
Frame 53 - Miss Porky is shown blowing an incredibly large bubble.	JANELLE: Miss Porky's blowing her bubble now. It's getting bigger and bigger and . . . why, this is amazing! She has broken the record! Her bubble measured 52.1 centimeters! Can Hermit blow a bubble large enough to beat Miss Porky? FUZZY BEAR: I always said she was full of hot air.

VISUAL	AUDIO
Frame 54 - Hermit the Frog is shown blowing a bubble that looks larger than he is.	JANELLE: The judges are measuring Hermit's bubble. It's going to be close. It's 52.2 centimeters! Hermit the Frog is the Puppet Superstar of the Year! (sounds of much cheering)
Frame 55 - Janelle is shown interviewing Hermit the Frog, who proceeds to try to thank all of the many members of his family for their support.	JANELLE: Now a word from Hermit. HERMIT THE FROG: I'd just like to thank all the people who made this victory possible . . . my mother, my father, my 261 brothers and sisters . . . namely, Aaron, Albert, Alden, Alfred, Allison, Arnold, Bruno, Buffy, Barbara, Biff, Betsy, Butch, Candy, Carl, Clyde . . . JANELLE: Ah, thank you, Hermit. HERMIT THE FROG: . . . Donald, Dan, Diane, Donna, Dudley . . .
Frame 56 - Drawing of girls and boys doing math puzzles, baking cakes, drawing, and measuring maps. Perhaps a drawing with four boxes, each containing a different contest.	JANELLE: Join us next week for the most interesting and exciting Superstar Contest yet--at your school. HERMIT THE FROG: . . . George, Glenda, Godfrey, Gretta . . .
Frame 57 - Headline of school newspaper: "Winner of MATHCO Superstar Contest--You Are All Winners."	NARRATOR: Who is the superstar of your class? You? Make up some interesting events, compute the results, and find out.

VISUAL	AUDIO
Frame 58 - (TITLE FRAME) Jet Liner 4265, Where Are You?	Jet Liner 4265, Where Are You?
Frame 59 - A youthful pilot is shown in the cockpit of a plane.	PILOT: Student Pilot 4265 to Will Rogers Airport control tower. Should I fly north 1,100 miles to get to Buffalo, New York? CONTROL TOWER: Ten-four. Due north 1,100 miles to hit Buffalo, New York.
Frame 60 - A plane is pictured flying over what appears to be Mexico.	PILOT: Then how come I'm looking over palm trees and adobe houses and it's mid-January? CONTROL TOWER: Hm-m-m. Sounds like Mexico. Are you sure you're reading your instruments correctly?
Frame 61- The student pilot is again shown in the cockpit of a plane.	PILOT: Pardon me, sir, but I don't read my instruments, I just play them. I play ~~the~~ guitar, the clarinet, and sometimes the piano . . . and I . . . CONTROL TOWER (interrupts, deliberately, and sounds somewhat vexed): I *don't mean music* instruments. I mean your *flight* instruments that let you know how high you're flying and in what direction you're going. PILOT: Oh, *those* instruments. I think I see some right here in front of me. You mean they can help me find out where I am?

VISUAL	AUDIO
Frame 62 - Student pilot and controller are pictured looking somewhat puzzled.	CONTROL TOWER: Yes, look at your compass. PILOT: You mean the things you draw circles with in geometry? I don't have one here right now.
Frame 63 - The controller looks quite exasperated.	CONTROL TOWER: No. There's one on your control panel with directions on it. Now, give me a reading.
Frame 64 - Pilot looks in notebook entitled "Readings."	PILOT (puzzled): A reading? (after a pause) All right! I can do that. I just wrote a little poem last night. I'll read it to you right now. Roses are red, violets are blue . . .
Frame 65 - Control tower scene.	CONTROL TOWER (interrupting): I was referring to a compass reading. (Suddenly airplane begins to make awful noises.) Control Tower to Student Pilot 4265. Do you read me? (click-click-click) Student Pilot 4265, do you read me? (pause) Ten-four.
Frame 66 - Photo of any map.	NARRATOR: Can you plot an accurate course on a flat map, using a compass and ruler? You'll be able to after you've done this MATHCO activity.
Frame 67 - Collage of some of the scenes in this audiovisual presentation.	NARRATOR: Naturally, in real life, the imaginary situations which you have seen in these skits could never happen.

VISUAL	AUDIO
Frame 68 - Student pilot is enclosed in circle. Students in classroom look up at him with expressions of extreme disbelief. Students are working on map.	STUDENT PILOT (interrupting): Hello, Control Tower, I think I have a reading from my compass. Hello . . . hello . . . is anyone . . . (voice dies out)
Frame 69 - (TITLE FRAME) MATH IN YOUR WORLD	NARRATOR: Well, under normal circumstances, these situations could never happen. But the students at Westminster Day School certainly had fun creating them. And your fun begins when you and your classmates and your teacher select the MATHCO activities which you will do in this module. How much math is there in your world?
Frame 70 - (CREDIT FRAME) Audiovisual developers	(Music)
Frame 71 - (CREDIT FRAME) MATHCO developers	(Music)
Frame 72 - (CREDIT FRAME) MATHCO National Review Board	(Music)
Frame 73 - DISCLAIMER	(Music)
Frame 74 - COMMERCIAL PRODUCT DISCLAIMER	(Music)
Frame 75 - THE END	(Music)

MODULE 3 ACTIVITIES

These MATHCO activities help students discover that basic mathematical concepts already familiar to them are also appropriate to elements found in the social sciences. Under your guidance, students will also become acquainted with careers that draw upon the math skills they will be using in these activities.

1. SURVEY Page 21

   Working in groups, students take a survey to find the most "typical" student in their class.

   SKILLS USED: Addition and computing percentage

2. TIME LINE Page 29

   Students construct historical time lines that use elements of mathematics to put events into perspective.

   SKILLS USED: Measuring and an understanding of fractions

3. PLANNING A TRIP Page 33

   Students each plan the route for a trip to a destination of their choice. They determine the distance to their destination and discover how long it will take them to get there from their home town.

   SKILLS USED: Measuring; estimating; using the formula TIME EQUALS THE DISTANCE DIVIDED BY THE RATE; and working with maps, fractions, and decimals

4. FLOWCHART Page 41

   Students learn some basic flowcharting principles as they design flowcharts for some common activities.

   SKILLS USED: Identification of basic shapes, concentration on details, and following directions

5. ELECTORAL COLLEGE Page 49

Using familiar math skills, students explore the system used by our country to elect the President and the Vice-president.

SKILLS USED: Bar graphing and computing percentage

6. ALLOTTED CLASSROOM AREA Page 57

Students make scale drawings of the floor plan of your classroom and determine each student's share of the available space.

SKILLS USED: Measuring, making a scale drawing, and computing perimeter and area

7. SCALE DRAWING: DREAM HOUSE Page 61

Each student designs and makes a scale drawing of his or her "dream house." Some students may choose to make a scale drawing of one floor of their homes instead.

SKILLS USED: Measuring, making scale drawings using graph paper, and computing perimeter and area

8. GLOBES VERSUS FLAT MAPS Page 65

Students sketch a map of the world on grapefruits (which represent globes). They discover the basic inaccuracies of flat maps as they compare them to the globes.

SKILLS USED: Proportional sketching and a keen power of observation

9. SURVEYING DEVICE Page 69

Students construct simple surveying devices and use them to survey a plot of "land."

SKILLS USED: Working with a protractor, measuring using the metric system, and making a scale drawing

10. BINARY COMPUTER Page 77

Students discover some basic principles of the binary computer as they conduct a survey using binary cards that they have made.

SKILLS USED: Measuring, basic knowledge of the base two (or binary) system, and working with percents

11. COMMERCIALS ON TELEVISION Page 87

Students discover how much of the television they watch is devoted to commercials, and assess to whom these commercials are geared.

SKILLS USED: Telling time; working with the second hand on a clock or watch; adding and subtracting hours, minutes, and seconds; computing percent; and estimating

12. SUPERSTAR CONTEST Page 97

Students create, organize, and run a superstar contest for their class.

SKILLS USED: Computing scores, making charts, measuring, and timing

13. NAVIGATION Page 103

Each student uses a magnetic compass to determine the positions of, and distances between, five cities of his or her choice. Students then exchange information and plot out the positions of someone else's cities on a blank map.

SKILLS USED: Reading and using a magnetic compass, interpreting and using the distance key on a map, and making an accurate chart

14. POPULATION GROWTH Page 111

After selecting five large cities from those listed on the Population Growth Information Sheets, students make a double bar graph recording population growth of these cities over a span of five, fifteen, or more years.

SKILLS USED: Making a double bar graph, making and interpreting charts, and rounding off large numbers

15. STOCK MARKET Page 117

Students follow the daily stock market reports for several days and develop a basic understanding of the stock market.

SKILLS USED: Working with fractions and percentages, dividing by decimals, and computing with money

16. SHOPPING AT THE STOCK MARKET Page 127

This activity should be preceded by Activity 15. Students each select from two to four different stocks, which they then follow for two weeks. They graph the progress of each of their stocks on a day-by-day basis.

SKILLS USED: An understanding of fractions, making a chart, making a graph, computing with money, and working with positive and negative numbers

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MODULE 3, NUMBER 1 - SURVEY

Teacher Activity Sheet

Overview

Your students will take a survey to find the most "typical" student in your class.

Math Skills Your Students Will Need

Addition and computing percentage.

Time Allotment

One to two class periods.

Objectives

Your students will:

1. Make up a census.
2. Reinforce their skills in computing percentage.
3. Sharpen their skills in effective group work.
4. Discuss results, using "official" terminology.

Materials Your Class Will Need

Survey Worksheets, paper, and pencils.

Vocabulary

survey:	a detailed investigation
category:	a specific grouping of information
data:	information to be used in a study
compile:	to gather information or facts into a collection

Self-Concept Builder

Your students will have an opportunity to combine socializing with completing a class assignment. They will also discover the importance of their personal preferences, as they determine the most typical student of their class.

Activity

1. Divide your class into groups of five or ten students (for ease in figuring percentages).
2. Each student should be given a Survey Worksheet. Make sure all students understand the Worksheet.
3. Each student in a small group will:
    a. Give the answers to the survey items to her or his group, one by one.
    b. Record the responses of each group member on his or her individual survey chart.
    c. Compile the group data on the Survey Worksheet and determine the percentage of the group voting for each choice on the chart. Each group will then have a "Typical Student Profile."
4. Have each group choose a spokesperson who will report its data to the class. Compile each group's data on the board, showing frequency of answers, to get a total class response. Determine the percentage of the students voting for the most typical answer in each category.
5. Have each of your students write a brief description of the most typical student in the classroom.
6. Discuss the outcome of the survey with your students. Is it as they expected it would be?

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

MARKETING RESEARCHER

GOVERNMENT CENSUS TAKER

PUBLIC OFFICIAL

SOCIOLOGIST

CULTURAL ANTHROPOLOGIST

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Make up your own survey and compile the results in a short report. Poll as many people as possible, to get the most accurate results.

MODULE 3, NUMBER 1 - SURVEY

Student Activity Sheet

Your Name ______________________________ Date ______________

Overview

In this activity, you will discover who is the most "typical" student in your class.

Math Skills You Need to Remember

Addition and computing percentage.

Things You Will Need

Survey Worksheet, paper, and a pencil.

Vocabulary

survey:	a detailed investigation
category:	a specific grouping of information
data:	information to be used in a study
compile:	to gather information or facts into a collection

When You Finish You Will Be Able To

Conduct a survey and compile the results mathematically.

Activity

1. See Worksheet.
2. Your teacher will help your class divide into groups of five or ten students.
3. Each student in a small group will:
    a. Answer survey items in his or her group, one by one.
    b. Record responses of each group member on his or her individual chart.
    c. Compile the group data on the Survey Worksheet to determine the percentage of the group voting for each choice on the chart. Each group will then have a "Typical Student Profile."

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4. With your teacher and class, help determine the most frequent answers and the percentage of the entire class voting for each choice.
5. Write a brief description of the most typical student in your class.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both women and men enter each of the occupations you've listed above?

Exploring on Your Own

Make up your own survey and compile the results in a short report. Poll as many people as possible, to get the most accurate results.

MODULE 3, NUMBER 1 - SURVEY

Worksheet

List the names of the classmates in your group on your Worksheet. With your group, decide upon a system whereby each of you answers each of the categories, while the rest of you (and the person answering the question) write down the responses on your Worksheets.

	CATEGORIES					
NAMES OF CLASSMATES	FAVORITE T.V. SHOW	AGE	FAVORITE RECORDING ARTIST OR GROUP	FAVORITE DESSERT	HOBBY	FAVORITE SPORT OR GAME
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
ITEM MENTIONED MOST OFTEN:						

Use the data you collected on the first page of this Worksheet to complete the "Typical Student Profile" below. (If two or more items tie for first place, you should list each of them on your Worksheet.)

TYPICAL STUDENT PROFILE

YOUR NAME: ____________________

NAMES OF THE OTHER STUDENTS IN YOUR GROUP:

____________________ ____________________ ____________________

____________________ ____________________ ____________________

____________________ ____________________ ____________________

CATEGORIES:	% OF STUDENTS WHO SELECTED THIS ITEM:
FAVORITE T.V. SHOW -	
AGE -	
FAVORITE RECORDING ARTIST OR GROUP -	
FAVORITE DESSERT -	
HOBBY -	
FAVORITE SPORT OR GAME -	

MODULE 3, NUMBER 2 - TIME LINE

Teacher Activity Sheet

Overview

In this activity, your students will construct historical time lines that use math skills to put events in perspective.

Math Skills Your Students Will Need

Measuring and an understanding of fractions.

Time Allotment

One to two class periods (plus homework).

Objectives

Your students will:

1. Make a time line.
2. Be introduced to the linear concept of time.
3. Measure and divide an event, using fractions.
4. Put events in sequential order.
5. Sharpen decision-making skills.

Materials Your Class Will Need

A roll of shelf paper or calculator tape, pencils, and felt-tip pens.

Vocabulary

time line:	a graphic presentation of a sequence of events
sequence:	the order in which things occur, one after another

Self-Concept Builder

Working in small groups, individual students will be helped by others. The activity is fairly simple mathematically and is an interesting way to approach history.

Activity

1. Have your students, in small groups, choose a series of events (e.g., America's Space Age) or a famous person's life (e.g., Martin Luther King or Susan B. Anthony) that students have recently studied and that can be put in a time line. These events can be of their own choosing. They may want to do a time line of a famous mathematician, a singer, an actor, the principal of your school, etc.
2. Remind your students that the length of time in question must be determined first. Then it is divided into equal segments, and a specific measure is determined for each segment. Students mark off and label each segment on the paper.
3. Students then find the exact date each event occurred.
4. They fill in the events according to the time they occurred.
5. Students are now ready to illustrate the time lines.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

HISTORIAN

AUTHOR OR PUBLISHER OF HISTORICAL BOOK

SOCIOLOGIST

ANTHROPOLOGIST

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

After determining the special events you feel have been important, make a time line of your own life.

MODULE 3, NUMBER 2 - TIME LINE

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will make a time line of a historical event or life of your choice.

Math Skills You Will Need to Remember

Measuring and an understanding of fractions.

Things You Will Need

A roll of shelf paper or calculator tape, a pencil, and a felt-tip pen.

Vocabulary

time line:	a graphic presentation of a sequence of events
sequence:	the order in which things occur, one after another

When You Finish You Will Be Able To

Make an accurate time line.

Activity

1. With your small group, choose a series of events (such as America's Space Age) or a famous person's life (such as Martin Luther King, Jr. or Susan B. Anthony) that you have recently studied.
2. Determine the length of time involved. Decide on what length of time and how many segments you wish to use. Each segment is an equal part of the entire time line. Can you present this idea mathematically? Mark off and label each segment on the paper.
3. Find the exact date each event occurred.
4. Fill in the sequence of events on the time line according to the time they occurred.
5. Illustrate your time line.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both women and men enter each of the occupations you've listed above?

Exploring on Your Own

After determining the special events you feel have been important, make a time line of your own life.

MODULE 3, NUMBER 3 - PLANNING A TRIP

Teacher Activity Sheet

Overview

Your students will each plan a route to a selected destination and determine the distance to that destination and the time it will take to get there.

Math Skills Your Students Will Need

Measuring; estimating; using the formula TIME = DISTANCE ÷ RATE; working with maps, fractions, and decimals.

Time Allotment

Two class periods, or one class period and homework.

Objectives

Your students will:

1. Read road maps.
2. Estimate distances.
3. Use map keys to measure distances.
4. Determine travel times.

Materials Your Class Will Need

Regional road map for each student or small group of students, string, Planning a Trip Worksheets, rulers, and pencils.

Vocabulary

destination:	the place or point to which someone or something is going
key:	an explanatory list of the symbols on a map or chart; also called a legend
route:	a road, course, or way to travel from one place to another
taut:	pulled tight or straight

Self-Concept Builder

Many students who are weak mathematically can still use road maps effectively. If students are paired or grouped for this activity, they can rely on combined knowledge to complete their Worksheets.

Activity

1. Your students may work individually or in groups to complete their Planning a Trip Worksheets.
2. Make sure all students understand Worksheet instructions, choose destinations that are quite a distance from your city or town, and understand the process of mapping out their route using string.
3. When your students have completed their Worksheets, discuss their findings with them.
4. Note: For additional exercises in automobile math, see MATHCO Module 4, Number 15.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

AUTOMOBILE CLUB TRIP PLANNER
TRUCK DRIVER
BUS SCHEDULER
TAXI DRIVER

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Using a map, plan a long-distance trip involving several days of driving. Determine the approximate distance to your final destination and how long it will take you to get there if you travel by car.

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MODULE 3, NUMBER 3 - PLANNING A TRIP

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will plan a trip to a city, town, or recreation area of your choice.

Math Skills You Need to Remember

Measuring; estimating, using the formula TIME = DISTANCE ÷ RATE; and working with maps, fractions, and decimals.

Things You Will Need

A regional road map, string, Planning a Trip Worksheet, a ruler, and a pencil.

Vocabulary

destination:	the place or point to which someone or something is going
key:	an explanatory list of symbols on a map or chart; also called a legend
route:	a road, course, or way to travel from one place to another
taut:	pulled tight or straight

When You Finish You Will Be Able To

Plan a route for an automobile trip to a destination you have chosen, figure out the distance to your destination, and determine how long it will take you to get there.

Activity

1. Your teacher will go over your Planning a Trip Worksheet with you and your classmates.
2. Complete your Worksheet, making sure to ask for help if you need it.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both women and men enter each of the occupations you've listed above?

Exploring on Your Own

Using a map, plan a long-distance trip involving several days of driving. Determine the approximate distance to your final destination and how long it will take you to get there if you travel by car.

MODULE 3, NUMBER 3 - PLANNING A TRIP

Worksheet

1. Choose a destination (city, town, or recreational area) that is quite a distance away from your own city or town and that you would like to visit. Write this information below.

   A. From ______________________________
   (Where you are now)

   B. To ______________________________
   (Where you would like to go)

   Now, what do you think is the distance from A to B? Write your estimate below.

   C. ____________________ miles
   (Estimate of distance from A to B)

2. Using a regional road map and a piece of string, map out the route you plan to use to get to your destination. Determine this distance by winding the string along the roads you have chosen to be your route. Then pull the string taut and measure the string with a ruler. Using the map's key, determine what this measurement is in miles and record it below.

   D. ____________________ miles
   (Actual distance from A to B)

   Compare D to C. Was your estimate close? ________________________

3. Computing how long it will take to reach a destination when you are traveling by car is easy to do. It makes planning a motor trip easier because you can estimate almost exactly the time of your arrival. Take a look at the following formula:

$$\text{TIME SPENT TRAVELING} = \frac{\text{DISTANCE TRAVELED}}{\text{MILES PER HOUR}}$$

   Another way of saying this is:

$$\text{TIME} = \frac{\text{DISTANCE}}{\text{RATE}}$$

4. Here are two example problems that use the formula TIME = DISTANCE ÷ RATE.

Example I: A car is traveling from point A to point B at a rate of 55 miles per hour. The distance from A to B is 110 miles. How long will it take the car to reach its destination?

Remember the formula:

$$\text{TIME} = \frac{\text{DISTANCE}}{\text{RATE}}$$

$$\text{TIME SPENT TRAVELING} = \frac{110 \text{ miles}}{55 \text{ mph}}$$

$$= \begin{array}{r} 2 \\ 55\overline{)110} \\ 110 \end{array}$$

$$= 2 \text{ hours}$$

Example II: Using the information from Example I, suppose the car traveled at a rate of 50 miles per hour?

$$\text{TIME SPENT TRAVELING} = \frac{110 \text{ miles}}{50 \text{ mph}}$$

$$= \begin{array}{r} 2.2 \\ 50\overline{)110.0} \\ \underline{100} \\ 10\ 0 \\ \underline{10\ 0} \end{array}$$

$$= 2.2 \text{ hours}$$

The 2.2 hours equals 2 2/10 hours. However, we usually think of time in terms of hours and minutes. Since there are 60 minutes in an hour, we must convert the .2 hour into minutes.

2.2 hours = 2 hours and _______ minutes?

Multiply 60 (minutes) by .2 hour to find the answer:

$$\begin{array}{r} 60 \\ \underline{\times\ .2} \\ 12.0 \end{array} \quad \text{(number of minutes per hour)}$$

The answer is 12 minutes. The time spent traveling in Example II is 2 hours and 12 minutes.

5. Using the formula and other information from this Worksheet, compute how long it would take you to arrive at the destination you chose (your answer to D, question 2) if you travel at the rates of speed given below.

	HOURS	MINUTES
(1) If you travel at a rate of 50 mph, you will arrive at your destination in . . .		
(2) If you travel at a rate of 55 mph, you will arrive at your destination in . . .		
(3) If you travel at a rate of 45 mph, you will arrive at your destination in . . .		
(4) If you travel at a rate of 47 mph, you will arrive at your destination in . . .		
(5) If you travel at a rate of 40 mph, you will arrive at your destination in . . .		
(6) If you travel at a rate of 35 mph, you will arrive at your destination in . . .		

MODULE 3, NUMBER 4 - FLOWCHART

Teacher Activity Sheet

Overview

Your students will become familiar with the basic concepts of the flowchart, which is one of the fundamental modes of operation used by persons in careers involving computer programming.

Math Skills Your Students Will Need

Identification of basic shapes, concentration on details, and following directions.

Time Allotment

One class period (and possibly homework).

Objectives

Your students will:

1. Make a simple flowchart.
2. Experience listing steps sequentially.
3. Discover how to categorize steps as decisions or instructions.

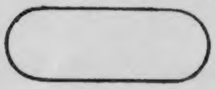
Materials Your Class Will Need

Flowchart Information Sheets, paper, and pencils.
(Optional: Flowcharting templates for each student or group of students)

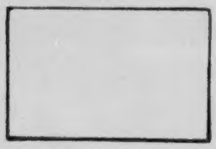
Vocabulary

programming:	to provide (a computer) with a set of instructions for solving a problem
flowchart:	a visual way of describing an activity by showing the path of each step or decision
flowcharting template:	a thin piece of plastic or metal cut with patterns or shapes that can be traced to make figures such as those shown on the next page; it is a basic tool of computer programmers

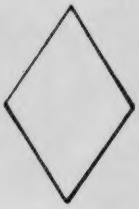
PROGRAMMING SYMBOLS



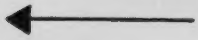
AN OVAL IS USED TO START AND STOP THE ACTIVITY.



A RECTANGLE IS USED TO GIVE EACH INSTRUCTION.



A DIAMOND IS USED TO SHOW A DECISION.



AN ARROW IS USED TO SHOW THE DIRECTION OF THE PATH.

Self-Concept Builder

Because this activity does not use computational math, less successful math students may experience real success with it. It is, however, an activity that all of your students should enjoy.

Activity

1. With your students, read and discuss the flowchart on changing a record on a record player that appears on their Flowchart Information Sheets.
2. Help students discover that flowcharts are used in making up both simple and complex computer systems--an activity similar to the one they will be doing.
3. Each student will make up a flowchart showing how to prepare a hamburger.
4. Encourage each student to use correct symbols. When students have finished, they may choose their own subjects for which to make flowcharts. Caution them to choose simple activities at first. Your more capable students may want to attempt something complicated. Let them. Their creativity can really soar on an activity like this.

5. The sample of a flowcharting template on your students' Flowchart Information Sheet gives your students some additional information about flowchart symbols.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

COMPUTER PROGRAMMER

SYSTEMS ANALYST

ENGINEER

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

1. Make a flowchart of an activity of your choice. Be careful to include each step and to use the proper symbols.
2. If you know someone who programs computers, perhaps you may get an opportunity to visit her or him on the job.

MODULE 3, NUMBER 4 - FLOWCHART

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will make a flowchart. Flowcharts are often made by people whose careers are in computer programming.

Math Skills You Need to Remember

Identification of basic shapes, concentration on details, and following directions.

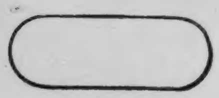
Things You Will Need

Flowchart Information Sheet, paper, and a pencil.

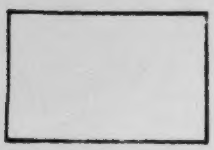
Vocabulary

programming:	to provide (a computer) with a set of instructions for solving a problem
flowchart:	a visual way of describing an activity by showing the path of each step or decision
flowcharting template:	a thin piece of plastic or metal cut with patterns or shapes that can be traced to make figures such as those shown on the next page; it is a basic tool of computer programmers

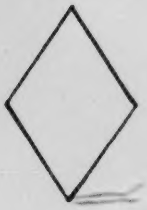
PROGRAMMING SYMBOLS YOU WILL BE USING



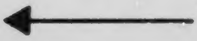
AN OVAL IS USED TO START AND STOP THE ACTIVITY.



A RECTANGLE IS USED TO GIVE EACH INSTRUCTION.



A DIAMOND IS USED TO SHOW A DECISION.



AN ARROW IS USED TO SHOW THE DIRECTION OF THE PATH.

When You Finish You Will Be Able To

Make a flowchart describing an activity of your choice.

Activity

1. Read and discuss the flowchart describing "How to Change a Record."
2. Make up your own flowchart describing "How to Prepare a Hamburger." Be sure to use the correct symbol for each step.
3. After your teacher has checked your flowchart, start on another one describing a simple activity of your choice. Or, if you want to try to create a complicated activity, go ahead and see how far you can get with it.
4. The sample of a flowcharting template on your Flowchart Information Sheet is just to give you some extra information about flowchart symbols. Can you find the basic symbols from this Activity Sheet on the template?

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

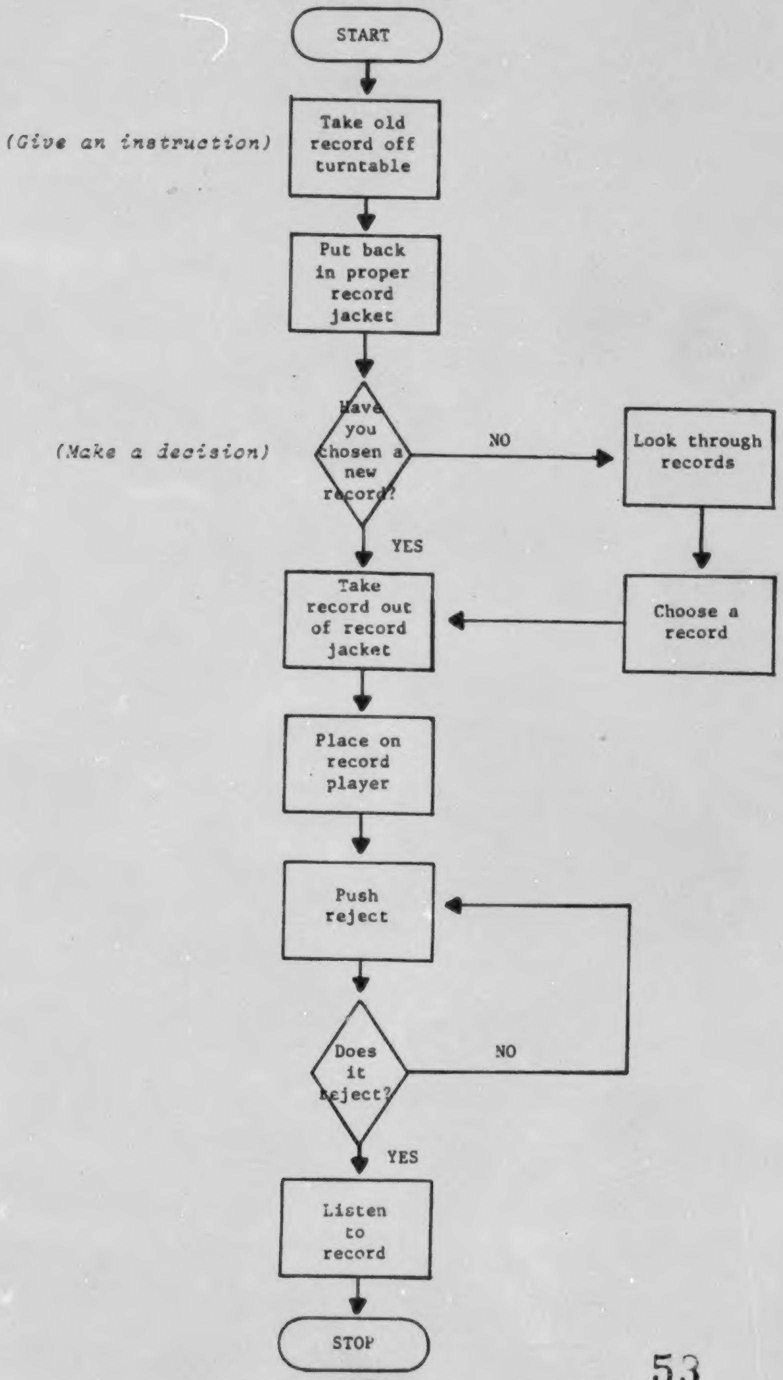
1. Make a flowchart of an activity of your choice. Be careful to include each step and to use the proper symbols.
2. If you know someone who programs computers, perhaps you may get an opportunity to visit her or him on the job.

MODULE 3, NUMBER 4 - FLOWCHART

Information Sheet

This is an example of a flowchart describing a simple activity. Look at it carefully before beginning your own flowchart.

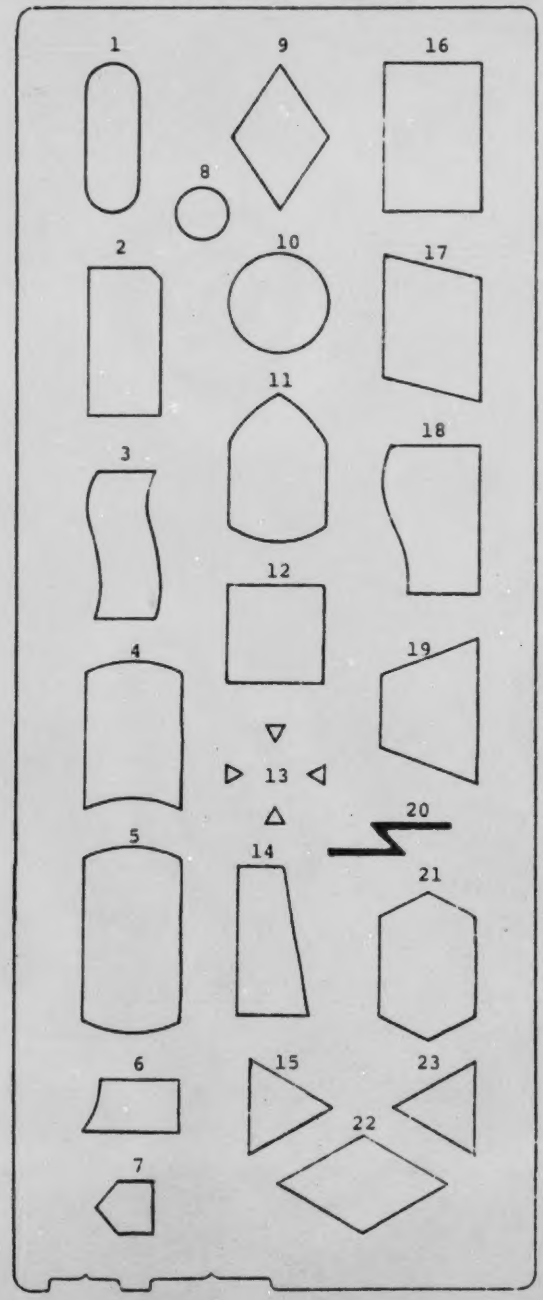
HOW TO CHANGE A RECORD


START
(Give an instruction)
Take old record off turntable
Put back in proper record jacket
(Make a decision)
Have you chosen a new record?
NO
Look through records
Choose a record
YES
Take record out of record jacket
Place on record player
Push reject
Does it reject?
NO
YES
Listen to record
STOP

Pictured below is a diagram of a tool used by professional computer programmers. Look at the column on the right to identify each of the symbols used to represent computer operations. You probably won't be very familiar with these terms, but it's fun to take a look into the world of computers. Remember, you can work with computers in the future, if you want to--and if you are prepared.

Can you pick out the four symbols you will be using in this MATHCO activity?

FLOWCHARTING TEMPLATE



1 - Terminal Interrupt (start, stop)
2 - Punched Card
3 - Punched Tape
4 - Online Storage
5 - Keying
6 - Transmittal Tape
7 - Offpage Connector
8 - Connector
9 - Decision
10 - Magnetic Tape
11 - Display
12 - Auxiliary Operation
13 - Arrowheads
14 - Manual Input
15 - Extract (Collate)
16 - Process/Comment (give an instruction)
17 - Input/Output
18 - Document
19 - Manual Operation
20 - Communication Link
21 - Preparation
22 - Sort
23 - Merge/Offline Storage

MODULE 3, NUMBER 5 - ELECTORAL COLLEGE

Teacher Activity Sheet

Overview

Your students will use math skills while exploring the system used by our country for electing the President and Vice-president of the United States. They will experience firsthand another way in which math skills are necessary in a career not usually thought to be math-oriented.

Math Skills Your Students Will Need

Bar graphing and computing percent.

Time Allotment

Two class periods.

Objectives

Your students will:

1. Rank states according to their amount of electoral votes.
2. Discover the relationship of states with abundant electoral votes to heavy campaigning in those states.
3. Construct a bar graph.
4. Use their math skills in a social problem-solving setting.

Materials Your Class Will Need

Electoral College Information Sheets, graph paper, paper, and pencils.

Vocabulary

apportionment:	to make a proportionate (equal) division or distribution of representatives among the states
Electoral College:	an elected body of women and men chosen by the states and the District of Columbia to elect the President and Vice-president of the United States

electoral vote:	the vote of electors representing each state; although a candidate for President may win the popular vote, 270 electoral votes are needed in order to be elected President
plurality:	an excess of votes over those cast for an opposing candidate

Self-Concept Builder

Your students should easily be able to list states according to the number of their electoral votes.

Activity

1. Give your students either the Electoral College Information Sheets or an up-to-date almanac listing the congressional apportionment.
2. Have your students list the states and their 1970 electoral votes according to size, largest number of votes to smallest.
3. Students will graph this information on graph paper using a bar graph.
4. Students will determine what percentage of the entire Electoral College is held by the five states having the most electoral votes.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

POLITICAL CANDIDATE

CAMPAIGN MANAGER

HISTORIAN

SOCIOLOGIST

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Discover more about the elections of 1824, 1876, and 1888. In each case, the loser won the popular vote but lost the electoral vote (and didn't become President after all).

MODULE 3, NUMBER 5 - ELECTORAL COLLEGE

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will discover the importance of the electoral vote in a presidential election.

Math Skills You Need to Remember

How to make a bar graph and computing percent.

Things You Will Need

Electoral College Information Sheet, graph paper, paper, and a pencil.

Vocabulary

apportionment:	to make a proportionate (equal) division or distribution of representatives among the states
Electoral College:	an elected body of women and men chosen by the states and the District of Columbia to elect the President and Vice-president of the United States
electoral vote:	the vote of electors representing each state; although a candidate for President may win the popular vote, 270 electoral votes are needed in order to be elected President
plurality:	an excess of votes over those cast for an opposing candidate

When You Finish You Will Be Able To

Bar graph the number of votes allotted to each state by the Electoral College.

Activity

1. Using the information on congressional apportionment, make a list of the states according to the number of 1970 electoral votes each had, largest number to the smallest.

2. Now make a bar graph, showing the electoral votes for each state in order of size.
3. Determine what percentage of the entire Electoral College is held by the five states having the most electoral votes.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Discover more about the elections of 1824, 1876, and 1888. In each case, the loser won the popular vote but lost the electoral vote (and didn't become President after all).

MODULE 3, NUMBER 5 - ELECTORAL COLLEGE

Information Sheet

ELECTORAL COLLEGE

The President and the Vice-president of the United States are the only elective Federal officials not elected by the direct vote of the people. They are elected by the members of the Electoral College, an institution that has survived since the founding of our nation, despite repeated attempts in Congress to alter or abolish it. In the elections of 1824, 1876, and 1888, the presidential candidates who received the largest number of popular votes failed to win a majority of the electoral votes (and lost their respective elections).

On presidential election day--the first Tuesday after the first Monday in November of every fourth year--each state chooses as many electors as it has senators and representatives in Congress. In 1964, for the first time, as provided by the Twenty-third Amendment to the United States Constitution, the District of Columbia voted for three electors. Thus, with 100 senators and 435 representatives, there are 538 members of the Electoral College. A majority of 270 electoral votes is needed to elect the President and the Vice-president.

Political parties customarily nominate their lists of electors at their respective state conventions. An elector cannot be a member of Congress or hold any Federal office.

Some states print the names of the candidates for President and Vice-president at the top of their November ballots, while other states list only the names of the chosen electors for each party. In either case, the electors of the party receiving the highest vote are elected. The electors meet on the first Monday after the second Wednesday in December in their respective state capitals or in some other place prescribed by their state legislatures. Following a long-established custom, they vote for their party's nominees, although the Constitution does not require them to do so. All of the state's electoral votes are then awarded to the winners. The only constitutional requirement is that at least one of the persons each elector votes for shall not live in that elector's home state.

Certified and sealed lists of the votes of the electors in each state are mailed to the President of the U.S. Senate. He or she opens them in the presence of the members of the Senate and House of Representatives in a joint session held on January 6 (or the next day if the 6th falls on a Sunday), and the electoral votes of all the states are then counted. If no candidate for the presidency has a majority, the House of Representatives chooses a President from among the candidates with the most votes; all of the representatives from each state combine to cast one vote to represent their state. If no candidate for the vice-presidency has a majority, the Senate chooses from the top two candidates; each senator votes as an individual.

In 1977, President Jimmy Carter recommended that the electoral system be abolished and that the President and the Vice-president be elected by a plurality of the national popular vote.*

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*The World Almanac and Book of Facts, 1978 (New York: Newspaper Enterprise Association, 1978, p. 318).

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CONGRESSIONAL APPORTIONMENT

	1970	1960
Alabama	7	8
Alaska	1	1
Arizona	4	3
Arkansas	4	4
California	43	38
Colorado	5	4
Connecticut	6	6
Delaware	1	1
Florida	15	12
Georgia	10	10
Hawaii	2	2
Idaho	2	2
Illinois	24	24
Indiana	11	11
Iowa	6	7
Kansas	5	5
Kentucky	7	7
Louisiana	8	8
Maine	2	2
Maryland	8	8
Massachusetts	12	12
Michigan	19	19
Minnesota	8	8
Mississippi	5	5
Missouri	10	10
Montana	2	2
Nebraska	3	3
Nevada	1	1
New Hampshire	2	2
New Jersey	15	15
New Mexico	2	2
New York	39	41
North Carolina	11	11
North Dakota	1	2
Ohio	23	24
Oklahoma	6	6
Oregon	4	4
Pennsylvania	25	27
Rhode Island	2	2
South Carolina	6	6
South Dakota	2	2
Tennessee	8	9
Texas	24	23
Utah	2	2
Vermont	1	1
Virginia	10	10
Washington	7	7
West Virginia	4	5
Wisconsin	9	10
Wyoming	1	1
District of Columbia	3	0
TOTALS	438	435

The chief reason why the Constitution required a census of the population to be taken every ten years was to provide a basis for the apportionment of representatives among the states. This apportionment has also largely determined the number of electoral votes allotted to each state.

The number of representatives in Congress for each state is determined by that state's population--except that each state is entitled to one representative regardless of population. A congressional apportionment has been made after each decennial (occurring every ten years) census except that of 1920.

Under the provisions of a law that became effective on November 15, 1941, apportionment of representatives is made by the method of equal proportions. In the application of this method, the apportionment is made so that the average population per representative has the least possible variation between one state and any other. The first House of Representatives, in 1790, had 65 members--or one representative for each 30,000 of the estimated population, as provided by the Constitution. As our population continued to grow, the number of representatives also increased. The total membership has been fixed at 435 since 1912, except that in 1964, the Twenty-third Amendment to the Constitution gave the District of Columbia three electoral votes.*

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*The World Almanac and Book of Facts, 1978 (New York: Newspaper Enterprise Association, 1978, p. 189).

MODULE 3, NUMBER 6 - ALLOTTED CLASSROOM AREA

Teacher Activity Sheet

Overview

Your students will make a scale drawing of the floor plan of your classroom to determine each student's share of available space.

Math Skills Your Students Will Need

Measuring, making a scale drawing, and computing perimeter and area.

Time Allotment

One class period.

Objectives

Your students will:

1. Measure linear distance.
2. Make and read a scale drawing of a floor plan.
3. Compute perimeter and area.
4. Estimate area of the room allotted per student.
5. Compute area of the room allotted per student.

Materials Your Class Will Need

Graph paper, blank paper, pencils, rulers, and a meter stick or yardstick.

Vocabulary

area:	a measurement of a flat surface determined by length times width and stated in square units
perimeter:	a measurement of the boundaries of a specific space
scale drawing:	a representation of something drawn in the same proportions, but with different measurements

Self-Concept Builder

Your students work individually while sketching the shape of the classroom. All other work is done in small groups so that your students may help each other.

Activity

1. Each student will sketch the shape of the classroom on a blank sheet of paper. In small groups, your students will measure the perimeter of the room (in meters or in feet). Each student will then estimate the number of square feet allotted to each individual in the class.
2. Using graph paper, the students will determine the measure each square represents, and each student will draw a scale representation of the classroom, including measurements.
3. In small groups, have your students determine the area and perimeter of the classroom, as well as the number of square feet (or meters) per student. Record these findings on paper. Compare answers. Have your students consider why there are variations in their answers.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

ARCHITECT
CONSTRUCTION SUPERVISOR
CARPENTER
FLOOR COVERING CONTRACTOR
ELECTRICIAN
PLUMBER
INTERIOR DESIGNER

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Construct a scale model of your classroom, using cardboard for the walls. Place doors, windows, blackboards, etc., in their properly measured locations.

MODULE 3, NUMBER 6 - ALLOTTED CLASSROOM AREA

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will discover how much space is allotted to you in your classroom.

Math Skills You Need to Remember

Measuring, making a scale drawing, and computing perimeter and area.

Things You Will Need

Sketching paper, graph paper, a pencil, a ruler, and a meter stick or yardstick.

Vocabulary

area:	a measurement of a flat surface determined by length times width and stated in square units
perimeter:	a measurement of the boundaries of a specific space
scale drawing:	a representation of something drawn in the same proportions, but with different measurements

When You Finish You Will Be Able To

Make a scale drawing of your classroom and compute the area allotted to each student in your class.

Activity

1. Sketch the shape of the classroom on a blank sheet of paper. In a small group, measure along the edge of the floor on all sides of the room and fill in these measurements on your sketch.
2. Estimate how much room is allotted to each student in your classroom.
3. Using graph paper, determine with your class what measure each square should represent. Draw a scale drawing of your room on the graph paper, using your sketch and measurements. Include your measurements on the drawing.

4. In small groups, determine the area of the classroom as well as the number of square feet or meters allotted to each student. Compare this figure with your estimate. How accurate were you?
5. Record findings on your graph paper. Compare your answers with those of the other groups. Why might these answers vary?

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Construct a scale model of your classroom, using cardboard for the walls. Place doors, windows, blackboards, etc., in their properly measured locations.

MODULE 3, NUMBER 7 - SCALE DRAWING: DREAM HOUSE

Teacher Activity Sheet

Overview

Each student will make a scale drawing of one floor of his or her home or "dream house."

Math Skills Your Students Will Need

Measuring, making scale drawings using graph paper, and computing area and perimeter.

Time Allotment

Two class periods and homework.

Objectives

Your students will:

1. Sketch a floor plan.
2. Measure linear distances.
3. Make and read a scale drawing of a floor plan.
4. Compute perimeter and area.

Materials Your Class Will Need

Sketching paper, graph paper, pencils, rulers, and a meter stick or yardstick.

Vocabulary

scale drawing:	a representation of something (e.g., buildings, houses) drawn in the same proportions, but with different measurements
area:	a measurement of a flat surface determined by length times width and stated in square units
perimeter:	a measurement of the boundaries of a specific space
dimension:	the measurement of a space in length, width, or height

Self-Concept Builder

The opportunity to design a "dream house" lets students explore their own creative instincts. Be sure to watch carefully for those students who need your help in getting started.

Activity

1. Have each student sketch the shape of one floor of her or his home or dream house.
2. For homework, have each student measure all the dimensions of the rooms in the sketch. This may be done in meters or feet. Record measurements on the sketch.
3. Using graph paper, students will determine the measure each square will represent and make a scale drawing of the floor plan.
4. Students will compute the perimeter and area of each room as well as the measurements for the entire floor plan. They will record this information on the scale drawing.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

ARCHITECT
CONSTRUCTION SUPERVISOR
CARPENTER
FLOOR COVERING CONTRACTOR
ELECTRICIAN
PLUMBER
INTERIOR DESIGNER

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Make a three-dimensional model of your floor plan, using cardboard for the walls. Include windows, doors, etc.

MODULE 3, NUMBER 7 - SCALE DRAWING: DREAM HOUSE

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will make a scale drawing of your home or your "dream house."

Math Skills You Need to Remember

Measuring, scale drawing, and computing area and perimeter.

Things You Will Need

Sketching paper, graph paper, pencil, ruler, and a meter stick or yardstick.

Vocabulary

scale drawing:	a representation of something (e.g., buildings, houses) drawn in the same proportions, but with different measurements
area:	a measurement of a flat surface determined by length times width and stated in square units
perimeter:	a measurement of boundaries of a specific space
dimension:	the measurement of a space in length, width, or height

When You Finish You Will Be Able To

Make a scale drawing of a floor plan of your home or "dream house" and compute the area and perimeter of that space.

Activity

1. Sketch the floor plan of one floor of your home or your dream house.
2. For homework, measure all the dimensions of the rooms in your sketch. Record these measurements on your sketch.
3. In class, using a piece of graph paper, determine the measure each square represents and make a scale drawing of your floor plan on this paper.
4. Compute the perimeter and area of each room as well as the area and perimeter of the entire floor plan. Record these figures on your scale drawing.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Make a three-dimensional model of your floor plan, using cardboard for the walls. Include windows, doors, etc.

MODULE 3, NUMBER 8 - GLOBES VERSUS-FLAT MAPS

Teacher Activity Sheet

Overview

Your students will discover how inaccurate a flat map is when it represents a round surface, by sketching a map on a grapefruit and comparing the results with flat maps.

Math Skills Your Students Will Need

Proportional sketching.

Time Allotment

Two class periods.

Objectives

Your students will:

1. Be able to distinguish the difference between flat and round map representations.
2. Make a sketch of the world on a round surface.
3. Compare global maps to flat maps for accuracy.
4. Be able to describe the ways in which global maps and flat maps differ.

Materials Your Class Will Need

Grapefruits or oranges, indelible markers, a globe, pencils, and a flat map of the world.

Vocabulary

cartographer:	one who makes maps
cartography:	the art of mapmaking or chart making

Self-Concept Builder

Your students have no right or wrong answers as they make the map. Because they are in small groups, they help each other make the final observations.

Activity

1. Group your students in twos. With a pencil, they will sketch a map of the world on a grapefruit. Provide a globe for reference.
2. When your students are satisfied with their efforts, they should go over the penciled lines with an indelible marker.
3. Students will carefully peel the grapefruit with one slit from north to south. Try to keep the peel whole. (This part is fun.)
4. Have your students try to flatten out the peel to make the map flat.
5. What happens? Have them write down their observations.
6. Now have your students observe a flat map, looking specifically at Greenland. Compare it to a globe showing the same country. How is the flat map different from the globe? Where is the biggest distortion located on the flat map?

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

CARTOGRAPHER (MAPMAKER)
NAVIGATOR
TRAVEL AGENT
PILOT

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

MODULE 3, NUMBER 8 - GLOBES VERSUS FLAT MAPS

Student Activity Sheet

Your Name ______________________________ Date ______________

Overview

In this activity, you will discover the difference between global and flat maps.

Math Skills You Need to Remember

Sketching in proportion.

Things You Will Need

A grapefruit or orange, an indelible marker (one that won't smudge or wash off), a globe, a pencil, and a flat map of the world.

Vocabulary

cartographer:	one who makes maps
cartography:	the art of mapmaking or chart making

When You Finish You Will Be Able To

Describe the basic ways in which flat maps and global maps differ.

Activity

1. With a pencil, sketch a map of the world on a grapefruit. Use a globe for reference.
2. When you're sure of your penciled sketch, go over it with an indelible marker.
3. Carefully peel the grapefruit with one slit, from north to south. Try to keep the peel whole.
4. Try to flatten out the peel to form a flat map.
5. What happens? ______________________________

____

____

6. Compare the drawing of a flat map of Greenland to its appearance on a globe. What is the difference?

____

____

____

____

7. Where are the greatest distortions located on the flat map?

____

____

____

____

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both women and men enter each of the careers you've listed above?

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MODULE 3, NUMBER 9 - SURVEYING DEVICE

Teacher Activity Sheet

Overview

Your students will make a simple surveying device and use it, thus experiencing one way in which math is used in land surveying.

Math Skills Your Students Will Need

Working with a protractor, measuring in the metric system, and making a scale drawing.

Time Allotment

One to two class periods.

Objectives

Your students will:

1. Make a simple surveying device.
2. Use a protractor to determine angles.
3. Draw a scale representation of a triangular section of "land."
4. Use and understand their surveying device.

Materials Your Class Will Need

Each group will need string (8 meters long), a protractor, a straw, a straight pin, a meter stick, a large cardboard box, and tape. Each student will need a Surveying Device Worksheet, paper, and a pencil.

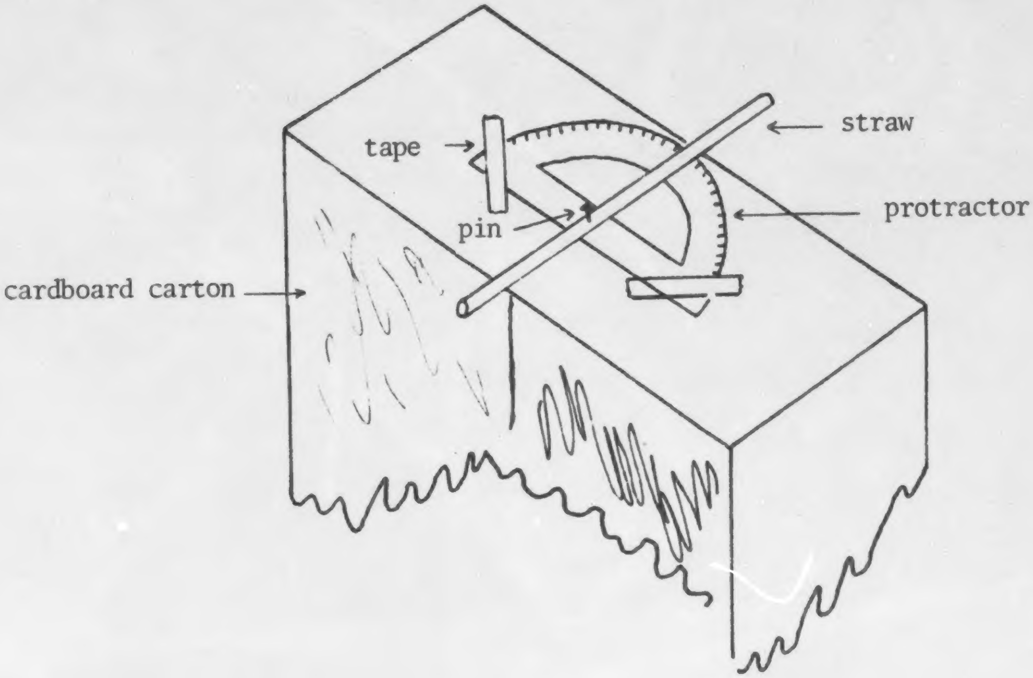
Vocabulary

survey: to determine the boundaries of an area by using angles and lines (distances)

Self-Concept Builder

Student groups will be able to choose their own objects on which to focus their surveys. Your more capable students may choose to do this activity independently. It's an excellent individual or small-group activity.

DIAGRAM OF THE SURVEYING DEVICE*



Activity

1. Let students discuss what a survey is and why surveys are used constantly in construction and in real estate.
2. Students are divided into small groups of three or four. Each group should have the following items:

   string (8 meters long)
   a protractor
   a straight pin
   a straw
   a meter stick
   tape
   a large (food-carton-size) cardboard box
3. Each group sets its box on its shortest side and finds the middle of the top (both lengthwise and crosswise). They mark that spot.

---

*This diagram also appears on your students' Surveying Device Worksheets.

4. Each group builds a surveying device on the top of its box, with the center of the protractor over the center mark on the top of the box.

5. Each group goes outside or into the gymnasium and attaches its eight meters of string to the ground or floor. Each group places its box on one end of the string so that the center of the protractor is directly over the end of the string.

6. Each group chooses an object to focus on that is at least five meters away from the string. By looking through the straw, the students sight the object, then look at the protractor for its measurement in degrees. They should record this information. They repeat this process by moving the box to the other end of the string and resighting the same object, again recording their findings.

7. On a piece of paper, students should draw a line to represent their string, using the scale 1 meter = 2 centimeters. Using the measurement of the angles of the object, they next recreate the angles on either end of the line, extending these new lines forming the angles until they cross. Your students have just surveyed a triangular plot of "land."

8. Your students should now be able to answer some questions about their diagrams. These questions appear on their Surveying Device Worksheets.

   (1) Knowing that triangles contain angles totaling 180°, can you measure the third angle on your diagram? ____________________
   What is its measurement? ____________________

   (2) Using the scale 1 meter = 2 centimeters, about how far away is the object you sighted? ____________________

   (3) Do you think this distance is accurate, or just a good estimate? ________________________ (If your teacher permits, actually go and measure the distance so you'll know for sure.)

   If the object is close enough, have your students actually measure the distance.

9. If time permits, have your student groups choose different objects to sight, and repeat steps 5 through 8.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

ENGINEER

UTILITY LINE INSTALLER

ARCHITECT

SURVEYOR (GOVERNMENT, REAL ESTATE, CONSTRUCTION)

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

You have already learned how to survey a triangular plot of land. Can you figure out how to measure a rectangular plot of land? Try it and see.

MODULE 3, NUMBER 9 - SURVEYING DEVICE

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will actually make a basic surveying device and discover how it works.

Math Skills You Need to Remember

Reading and drawing angles with a protractor, measuring in metrics, and making a scale drawing.

Things You Will Need

You will need a Surveying Device Worksheet, paper, and a pencil. Your group will need some string (8 meters long), a protractor, a straw, a straight pin, a meter stick, a large cardboard box, and some tape.

Vocabulary

survey:	to determine the boundaries of an area by using angles and lines (distances)

When You Finish You Will Be Able To

Make a diagram of a triangular section of "land" using a surveying device that you have made.

Activity

1. After you and your classmates have divided into small groups and discussed what a survey is, be sure your group has the following items:

    string (8 meters long)
    a protractor
    a straight pin
    a straw
    a meter stick
    tape
    a large (food-carton-size) cardboard box

2. Set your box on its shortest side and find the middle of its top (both lengthwise and crosswise). Mark that spot.
3. With your group, build the surveying device pictured on your Surveying Device Worksheet, with the center of the protractor over the center mark on the top of the box.
4. Go outside or into the gym (if your school has one), and measure out eight meters of string. Secure the string ends to the ground or floor and place your box on one end so that the center of the protractor is directly over that end of the string.
5. With your group, choose an object that is at least five meters away from the end of your string. By looking through the straw, sight the object, then look at the protractor for its measurement in degrees. Record this information on a piece of paper. Repeat this process by moving the box to the other end of the string and again sighting the same object. Record this information.
6. On another piece of paper, draw a line to represent the string, using the scale 1 meter = 2 centimeters. Using the measurements of the angles of the object, recreate the angles on either end of the line. Extend these new lines which form the angles until they cross. This spot represents where the object you sighted was.
7. Now, answer the questions on the bottom of your Surveying Device Worksheet.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

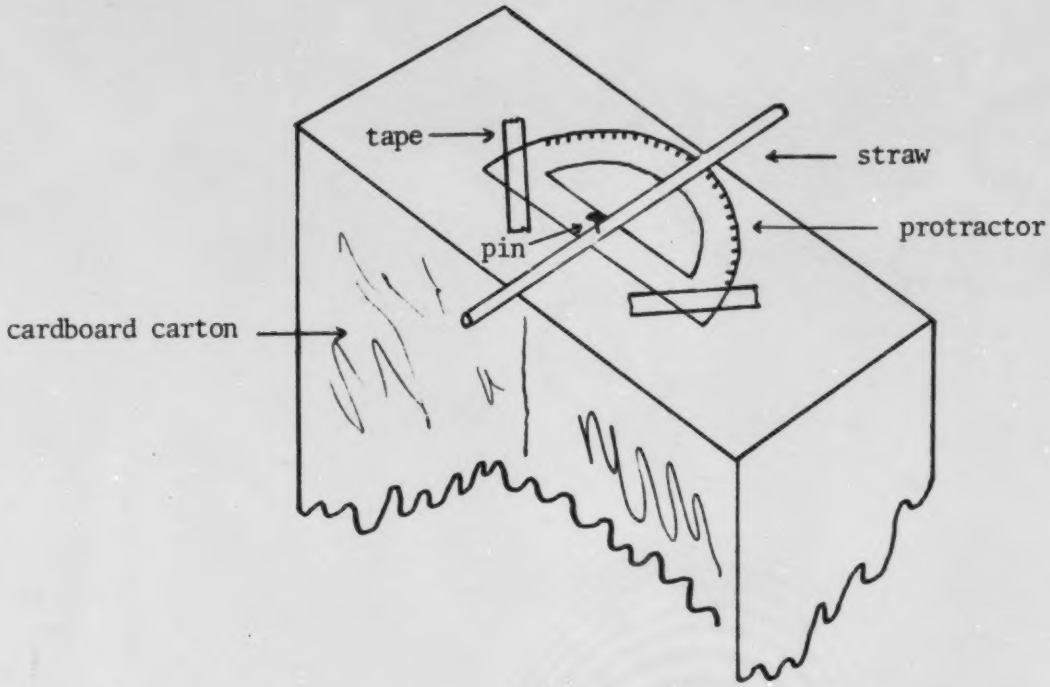
Exploring on Your Own

You have already learned how to survey a triangular plot of land. Can you figure out how to measure a rectangular plot of land? Try it and see.

MODULE 3, NUMBER 9 - SURVEYING DEVICE

Worksheet

DIAGRAM OF THE SURVEYING DEVICE YOU WILL BE MAKING



After you have helped make a surveying device and completed your scale drawing, try to answer the following questions:

1. Knowing that triangles contain angles totaling 180°, can you measure the third angle on your diagram? ________________ What is its measurement? ________________________________

2. Using the scale 1 meter = 2 centimeters, about how far away is the object you sighted? ____________________________

3. Do you think this distance is accurate or just a good estimate?

____

(If your teacher permits, actually go and measure the distance so you'll know for sure.)

MODULE 3, NUMBER 10 - BINARY COMPUTER

Teacher Activity Sheet

Overview

In this activity, your students will conduct a survey using binary cards that they have made. They will discover some basic principles of binary computers.

Math Skills Your Students Will Need

Measuring, basic knowledge of base two (or binary) system, and working with percentages.

Time Allotment

One to two class periods.

Objectives

Your students will:

1. Learn how to use a binary punch card system in conducting a survey.
2. Formulate ten questions to be used in the survey.
3. Compute percentages of students responding yes to each question and percentages of students responding no to each question.
4. Conduct a survey.

Materials Your Class Will Need

One 3" x 5" index card for each student in the class, rulers, pencils, paper punches (one for every two to four students), and a paper clip.

Vocabulary

binary:	having two distinct parts; the base two system of numbers
binary computer:	a computer that can tabulate binary information very rapidly--much faster than people can organize the information by hand
survey:	to determine or consider the condition of something

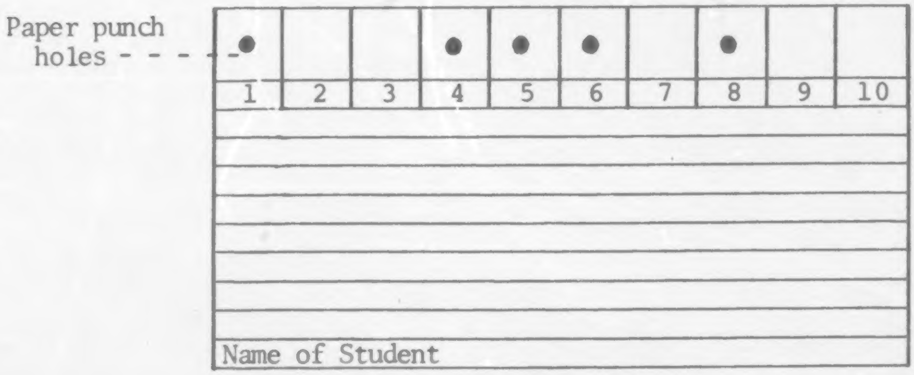
Self-Concept Builder

Your students will enjoy this simple exercise as they organize and conduct their survey and record the information found.

Activity

1. Explain to your students that they will be taking a small survey, which will be recorded on cards similar to those used by computers.
2. Discuss with your class or review with them basic principles of the binary system (base two). Yes and no answers to a survey employ these binary system principles.
3. With your class, choose ten questions about any topic or topics in which they are interested. Each question must call for a yes or no response. Every student should copy these questions on his or her Student Activity Sheet.*
4. Each student will prepare an index card on which to record her or his responses to the survey questions. Students should measure off 1/2-inch marks on the tops of their cards. With their rulers, they should connect these respective points down to the second line from the top of the card. Each section should be numbered, from one to ten, from left to right. These sections will correspond with survey questions one to ten. Each student's name should appear at the bottom of his or her card.

SAMPLE BINARY PUNCH CARD



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*Note: Please make certain that no question selected for the survey may in any way be potentially embarrassing to any student.

5. Students are now ready to conduct their survey. They should work in pairs or in relatively small groups. When they ask Question 1, if the response is yes, a hole should be punched with a paper punch in section 1 of the card of the person answering the question. If the answer to Question 1 is no, the section 1 space should be left blank. The rest of the survey should be conducted in this manner.
6. With all your students back at their own desks, it is now time for them to find out the results of their survey. Form a human "binary computer" by selecting two students to collect the punched cards. The first student should hold an opened-up paper clip, and as she or he walks through the class, each student whose card has a yes response to Question 1 will hang the card on the paper clip through the punched hole in section 1. Right behind him or her walks the second student, who collects the no responses to Question 1. At the front of the room, these students should count both the yes and no responses and put these totals on the board.
7. Using different human "binary computers," repeat this procedure for the other nine questions.
8. With your students, discuss the fact that binary computers can do this operation instantaneously, but also that these computers employ the same methods that were used by the class. If computer cards are available, show them some.
9. Your students will now figure the percentages of yes and no answers to each question and fill in this information on their Student Activity Sheets.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

COMPUTER PROGRAMMER

SYSTEMS ANALYST

KEYPUNCH OPERATOR

COMPUTER REPAIRPERSON

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

1. Find out more about computers and how they work. Perhaps one of your parents or a classmate's parent works with computers and can explain more about them to you and your class.
2. It might be possible for you to visit a local computer company or a company that uses computers regularly.

MODULE 3, NUMBER 10 - BINARY COMPUTER

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you and your classmates will conduct a survey and find your results using the basic principles of a binary computer. You may even get a chance to become part of a human "binary computer."

Math Skills You Need to Remember

Measuring, knowledge of base two (or binary) system, and percentages.

Things You Will Need

Your class will need some paper punches and a paper clip. You will need a 3" x 5" index card, a ruler, and a pencil.

Vocabulary

binary:	having two distinct parts; the base two system of numbers
binary computer:	a computer that can tabulate binary information very rapidly--much faster than people can organize the same information by hand
survey:	to determine or consider the condition of something

When You Finish You Will Be Able To

Organize and conduct a survey using binary punch cards to show the responses of the people you poll.

Activity

1. After your class has discussed some details of the binary system, help make up a survey of ten questions that can be answered by a yes or no response. Copy these questions in the following manner:

Two lines are drawn after each number to allow you space to copy down each survey question. Don't worry about the third line, which says "Percentage of YES responses," and the fourth line, which says "Percentage of NO responses." You will be able to fill in this information later, after your class has completed the survey.

1. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

2. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

3. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

4. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

5. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

6. ______________________________

____

Percentage of YES responses ________

Percentage of NO responses ________

7. ____

____

Percentage of YES responses ________
Percentage of NO responses ________

8. ____

____

Percentage of YES responses ________
Percentage of NO responses ________

9. ____

____

Percentage of YES responses ________
Percentage of NO responses ________

10. ____

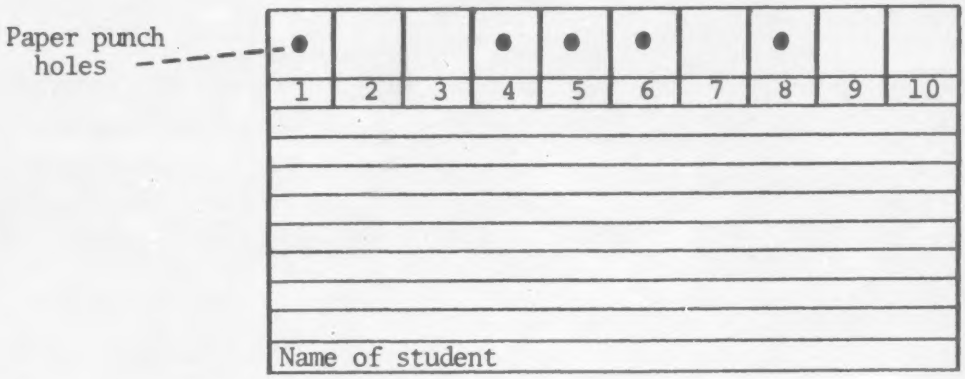
____

Percentage of YES responses ________
Percentage of NO responses ________

2. Using an index card, measure off 1/2-inch marks on the top of the card. With your ruler, connect these respective points down to the second line from the top of the card. Each section should be numbered from one to ten from left to right. These sections will correspond with survey questions one to ten. Your name should appear at the bottom of your card. The card will be used to record your responses to the ten survey questions.

A sample card is shown on the following page.

SAMPLE BINARY PUNCH CARD



3. You are now ready to conduct the survey with a partner or in a small group. Take someone's card and ask that person Question 1. If the answer is yes, use a paper punch to make a hole in section 1 of the card; if the answer is no, leave section 1 blank. Do the same for the nine other questions. Another person will take your card and ask you all ten questions in the same way.
4. After everyone in your class has been surveyed, go back to your desk. It's now time for you to find out the results of your class survey.
5. Two students will form a human "binary computer" and collect everyone's punched cards. The first student holds an opened-up paper clip, and as she or he walks through the class, every student whose card has a yes response to Question 1 hangs the card on the paper clip through the punched hole in section 1. Right behind him or her walks the second student, who collects the no responses to Question 1. At the front of the room, the students count both yes and no responses and put their totals on the chalkboard. Keep track of these totals, as you will need to do some figuring with them later on.
6. Using other human "binary computers," repeat the above procedure until you know the results of all ten survey questions.
7. Use the information your class has gathered to compute the percentages of yes and no responses to all ten questions. Fill in your answers on pages two and three of this Activity Sheet under each question.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

1. Find out more about computers and how they work. Perhaps one of your parents or a classmate's parent works with computers and can explain more about them to you and your class.
2. It might be possible for you to visit a local computer company or a company that uses computers regularly.

MODULE 3, NUMBER 11 - COMMERCIALS ON TELEVISION

Teacher Activity Sheet

Overview

Your students will determine how much of the television they watch is devoted to commercials, and to whom these commercials are geared.

Math Skills Your Students Will Need

Telling time; working with the second hand on a clock or watch; adding and subtracting hours, minutes, and seconds; computing percentages; and estimating.

Time Allotment

Ten minutes of one period, homework, and one whole period (or two) for calculations and discussion.

Objectives

Your students will:

1. Use a watch or clock with a second hand to determine time.
2. Add and subtract time.
3. Estimate the percentage of television viewing time devoted to commercials.
4. Compute the percentage of television viewing time devoted to commercials.
5. Classify products advertised on television.

Materials Your Class Will Need

Commercials on Television Worksheets, a watch or clock with a second hand, a television set, paper, and pencils.

Vocabulary

excluding:	omitting, leaving out

Self-Concept Builder

Since your students are watching television for a purpose, this assignment should be fun as well as enlightening.

Activity

1. Explain to your class that these activities involve homework. They are each to watch television this afternoon and/or evening for one-half hour or one hour and to fill out the Commercials on Television Worksheet, making an accurate list of the programs they watch, noting the time each show begins and ends, and writing down what type of product each commercial has promoted. It is necessary for each of them to have at hand a watch or clock with a second hand (a stopwatch could also be used). Tomorrow they will compute how much of the television they watched was really devoted to the program.
2. On the next day, your students will each have a list of the programs, times, commercials, and types of products advertised. Using the questions on their Activity Sheets, have each student add up the total amount of time he or she watched television. Next, have them total the amount of time the programs themselves were on. Finally, have them determine the amount of time devoted to commercials. (The last two totals should add up to the first.) Compare totals with the class and discuss the following questions: Did they realize so much of their programs was interrupted by commercials? How many programs did they watch? How many commercials did they see? Estimate the amount of time commercials took, compared to the amount of time they watched television.
3. Have your students compute the percentage of time devoted to commercials out of the total time they watched television. What was the most frequent percentage?
4. Have each student determine the most popular type of product advertised during the time he or she watched television. Compare throughout the class. Did anyone watch television during the afternoon? What was the most frequent product advertised? What about in the early evening--6:00 to 8:00 p.m.--or during the late evening? To whom are these commercials geared?

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

TELEVISION NETWORK SCHEDULER
ADVERTISING PERSONNEL AT NETWORKS
ADVERTISING AGENT
TELEVISION OR RADIO TECHNICIAN
WRITER
DIRECTOR
ACTOR OR ACTRESS

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Do the same study again, but this time try to watch television during the morning, afternoon, and evening. Before you begin, guess what types of products will be most frequently advertised during these hours. How did your guesses compare with the facts of your study? What about Public Television? Are there commercials on PBS programs? Why or why not?

MODULE 3, NUMBER 11 - COMMERCIALS ON TELEVISION

Student Activity Sheet

Your Name ________________________________ Date ____________

Overview

In this activity, you will discover how much time on television is really devoted to the program(s) you have chosen to watch.

Math Skills You Need to Remember

Telling time, adding and subtracting time, computing percentages, and estimating.

Things You Will Need

Commercials on Television Worksheet, a watch or clock with a second hand, a television set, your Activity Sheet, and a pencil.

Vocabulary

excluding:	omitting, leaving out

When You Finish You Will Be Able To

Compute the percentage of time devoted to programs you watch on television, excluding commercials.

Activity

1. For homework, you are to watch television in the afternoon and/or evening. Carefully fill out your Commercials on Television Worksheet, listing the programs you watch, when they start and end, when the commercials begin and end, and what products are being advertised. Be sure to write down this information as accurately as possible.
2. a. On the next day in class, total the entire amount of time you watched television.

   ____

   b. Total the amount of time the programs themselves were on.

   ____

c. Total the time when the commercials were on.

____

d. How many programs did you watch? _______________

e. What were the names of the programs you watched?

____

____

f. How many commercials did you see? _______________

3. a. Estimate the percentage of time the commercials take out of the allotted time for the program.

_______________ percent

b. Compute, using your figures, what actual percentage of time commercials took during the time you watched television.

_______________ percent

4. What were the most frequently advertised types of products that you saw during your television viewing?

_______________ _______________

_______________ _______________

_______________ _______________

5. Be prepared to share what you have discovered in a class discussion.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both women and men enter each of the occupations you've listed above?

Exploring on Your Own

Do the same study again, but this time try to watch television during the morning, afternoon, and evening. Before you begin, guess what types of products will be most frequently advertised during these hours. How did your guesses compare with the facts of your study? What about Public Television? Are there commercials on PBS programs? Why or why not?

MODULE 3, NUMBER 11 - COMMERCIALS ON TELEVISION

Worksheet

Use this Worksheet to keep track of the information you gather as you watch television. You should watch one half-hour program, two half-hour programs, or one one-hour program. You will need a watch or a clock with a second hand to be able to time the commercial breaks accurately. Keep careful records. You will use this information tomorrow in class.

A. Name of program: ______________________________

Time program begins: __________ Time program ends: __________

Time first commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time first commercial break ends: __________

Time second commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time second commercial break ends: __________

Time third commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time third commercial break ends: __________

Time fourth commercial break begins: ____________

Type or types of products advertised: ______________________________

____

____

Time fourth commercial break ends: ____________

Time fifth commercial break begins: ____________

Type or types of products advertised: ______________________________

____

____

Time fifth commercial break ends: ____________

Time sixth commercial break begins: ____________

Type or types of products advertised: ______________________________

____

____

Time sixth commercial break ends: ____________

Time seventh commercial break begins: ____________

Type or types of products advertised: ______________________________

____

____

Time seventh commercial break ends: ____________

If you are watching one half-hour program, you may stop here. If you are watching two half-hour programs, keep track of your second program commercials on the following two pages. If you are watching one one-hour program, write the name of your program again on the top of page three and after it write "(second half)." You will keep track of the commercials during the second half of your program on the next two pages.

B. Name of program: ____________________

Time program begins: __________ Time program ends: __________

Time first commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time first commercial break ends: __________

Time second commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time second commercial break ends: __________

Time third commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time third commercial break ends: __________

Time fourth commercial break begins: __________

Type or types of products advertised: ____________________

____

____

Time fourth commercial break ends: __________

Time fifth commercial break begins: __________

Type or types of products advertised: ______________________________

____

____

Time fifth commercial break ends: __________

Time sixth commercial break begins: __________

Type or types of products advertised: ______________________________

____

____

Time sixth commercial break ends: __________

Time seventh commercial break begins: __________

Type or types of products advertised: ______________________________

____

____

Time seventh commercial break ends: __________

Time eighth commercial break begins: __________

Type or types of products advertised: ______________________________

____

____

Time eighth commercial break ends: __________

MODULE 3, NUMBER 12 - SUPERSTAR CONTEST

Teacher Activity Sheet

Overview

Your students will create, organize, and run a superstar contest for their class.

Math Skills Your Students Will Need

Computing scores, making charts, measuring, and timing.

Time Allotment

Five days of full class time (or ten days of partial class time).

Objectives

Your students will:

1. Determine ten events or activities in which all students can take part and have an equal chance of winning.
2. Organize and run a class superstar contest.
3. Compute results mathematically.
4. Use measurement skills for time and distances.
5. Develop good sportsmanship.
6. Develop cooperation and respect for one another.

Materials Your Class Will Need

Poster board, felt-tip pens, paper, and pencils; other needs will be determined by students' choice of activities.

Self-Concept Builder

Your students may individually choose in which of the varied activities they will compete. They will tend to select those activities in which they are strongest or most interested.

Activity

1. Explain to your students that they will create their own superstar contest for their class. Since not all of your students are academically, artistically, or physically strong, have them discuss and choose events that are either evenly distributed among all areas or are events for which none of these skills are required.
2. Make a list on the board of all activities suggested, then discuss each one and how it would fit into the contest. Finally, choose ten activities that will determine the class superstar. Some examples could be: bubble gum bubble blowing contest, arm wrestling, sketching contest, softball throw, three-legged race, sack race, 10-meter dash, short story competition, photography contest, cooking contest, broad jump, drawing contest, spelling contest, math races.
3. Once events are determined, have your students make sign-up sheets for each activity and tell them to sign up for seven contests and be prepared to participate in the other three.
4. Have your students make up a chart listing each student's name and all the events. Points won for each event will be recorded on this chart. Score as follows:
   - 5 points to first place
   - 4 points to second place
   - 3 points to third place
   - 2 points to fourth place
   - 1 point to fifth place
5. At the end of the superstar contest, compute each student's score and determine the winners through fifth place.

Hints: Have students who are not signed up for a particular contest "run through" the event anyway. This will eliminate the possibility of groups of students just standing around. However, students will only be judged in the seven events for which they signed up.

The list of contestants for each event should be announced as soon as possible to speed up planning and preparations. Also, announce the schedule of events so that students may prepare further. For some events, it may be advisable to have other teachers involved in the judging rather than using a group of students--discuss this option for each event. A prize could be awarded to the "superstar" of the class (e.g., a free lunch, a certificate. or something else that is meaningful).

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

PHYSICAL EDUCATION INSTRUCTOR

RECREATION INSTRUCTOR

PRODUCER OF A SUPERSTAR-TYPE CONTEST
ON TELEVISION

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Organize a superstar contest for your own neighborhood, your family, your club.

MODULE 3, NUMBER 12 - SUPERSTAR CONTEST

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will help organize and participate in a class superstar contest.

Math Skills You Need to Remember

Computing scores, making a chart, measuring, and timing.

Things You Will Need

Poster board, felt-tip pen, paper, and a pencil; other needs will be determined by your choice of activities.

When You Finish You Will Be Able To

Organize, compute, and participate in a superstar contest.

Activity

1. With your class, help make a list of as many possible events as you can think of for the superstar contest. Remember, not everyone is strong physically, academically, or artistically, so choose events that represent all kinds of skills.
2. After the class has discussed all events, as a group decide on ten events for the contest.
3. Choose seven events you would like to enter, and be prepared to participate in the other three.
4. Help make a poster showing each of the events and who is participating in each event. The points won for each event will be recorded on this chart. Scoring should go like this:

   5 points to first place
   4 points to second place
   3 points to third place
   2 points to fourth place
   1 point to fifth place

5. Help compute the winners of each event. Have fun, and good luck!

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Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Organize a superstar contest for your own neighborhood, your family, your club.

MODULE 3, NUMBER 13 - NAVIGATION

Teacher Activity Sheet

Overview

Each of your students will use a magnetic compass to determine the positions of, and distances between, five cities of their choice and will record this information on a chart. They will then exchange information, and other students will plot out the positions of these cities on blank maps.

Math Skills Your Students Will Need

Reading and using a magnetic compass, interpreting and using a distance key on a map, and making an accurate chart.

Time Allotment

Two class periods.

Objectives

Your students will:

1. Read and use a magnetic compass.
2. Use map skills to determine distance.
3. Take compass readings, determine distance in miles, and make a chart of their findings.
4. Recreate a plotted journey on a blank map, using given compass readings and distances.
5. Discover some basic processes of navigation.

Materials Your Class Will Need

Navigation Worksheets, a map of the United States for each student, magnetic compasses (for each student or pair of students), rulers, tracing paper, and pencils.

Vocabulary

dead reckoning:	a method of estimating the position of a place or an object that does not use astronomical observations, but that does apply previously determined position, course, and distance traveled

degree:	a unit of angular measure equal in magnitude to the central angle, which contains 360 divisions
magnetic compass:	an instrument that shows direction relative to the earth's magnetic field
magnetic north:	the direction of the earth's magnetic pole; the north-seeking pole of a magnetic needle points in this direction when it is free from local magnetic influences

Self-Concept Builder

Students will use an actual tool of navigation and the method of dead reckoning to plan a trip of their own choosing.

Activity

1. Your students may work individually or in pairs. Each student or pair of students plans a trip to any five U.S. cities and decides the order in which they will be visited. Using a map of the United States, they locate these cities and draw straight lines from city to city, beginning with their own city or town and going to the first city of their choice. From there, they draw a line to the second city, and so on.
2. Using magnetic compasses, students line up magnetic north with the north on their maps. Starting with their own city or town, they plot compass readings to their first city and record this information on their Navigation Worksheets. Putting the compass on their first city, they record the readings to their second city, and so forth, until readings to all five cities have been determined.
3. Using a ruler and the key to the map of the United States, students determine the distance in miles from city to city and record this information on their Navigation Worksheets.
4. Individuals or pairs should then trade completed Navigation Worksheets.
5. Individuals or pairs then trace (on tracing paper) the outline of the U.S. map and mark the location of their own city or town.
6. Using the calculations on the Navigation Worksheets that have been exchanged for theirs, they plot the locations of the described cities on their blank maps.
7. When they have finished this task, students compare the maps they have just constructed with the original maps and determine just how accurate the given measurements were.

8. If time permits, repeat the activity, using as many cities as students wish.
9. Discuss with your students what they have observed about the importance of accuracy while doing this activity.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

NAUTICAL OR AVIATION NAVIGATOR
NAUTICAL OR AVIATION PILOT
SURVEYOR
AIRPORT GROUND CONTROLLER

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful at most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Choose a destination and, by using a starting point and several "stops" along the route, make up a navigation chart showing compass directions and distances to the mystery city you have chosen. Can your classmates or friends find your secret city?

MODULE 3, NUMBER 13 - NAVIGATION

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will use a magnetic compass and navigation skills to plan a trip to five cities of your choice.

Math Skills You Need to Remember

Reading and using a magnetic compass, interpreting and using a distance key on a map, and making an accurate chart.

Things You Will Need

Navigation Worksheet, a map of the United States, a magnetic compass, a ruler, tracing paper, and a pencil.

Vocabulary

dead reckoning:	a method of estimating the position of a place or an object that does not use astronomical observations, but that does apply previously determined position, course, and distance traveled
degree:	a unit of angular measure equal in magnitude to the central angle, which contains 360 divisions
magnetic compass:	an instrument that shows direction relative to the earth's magnetic field
magnetic north:	the direction of the earth's magnetic pole; the north-seeking pole of a magnetic needle points in this direction when it is free from local magnetic influences

When You Finish You Will Be Able To

Plot the locations of five cities on a blank map, using only the information that has been gathered on a Navigation Chart.

Activity

1. Select five U.S. cities and arrange them in the order in which you would like to visit them.
2. Using a map of the United States, locate these five cities. Beginning with your own city or town, draw a straight line connecting it with the first city of your choice. Connect that city to your second city, and so on, until all five cities are connected.
3. Using a magnetic compass, line up magnetic north with the north on your map. Place the compass on your own city or town and find the directional reading to the first city along your lined route. Record this information on the Navigation Worksheet. Place the compass on the location of your first city and take the compass reading to your second city. Continue this process for all five of your cities and record all of the compass readings on your Navigation Worksheet.
4. Using your map's key, determine the distance to each city along your route, from your city or town to your first city, from your first city to your second city, and so on. Record this information on your Navigation Worksheet.
5. Exchange your Navigation Worksheet with another person or pair.
6. Trace an outline of the United States, using tracing paper on your original map. Mark your town's or city's location.
7. Using the calculations on the Navigation Worksheet that has been exchanged for yours, plot the positions of the five cities shown on it on your traced map.
8. When you have finished, compare the map you have made with the other person's or pair's original map.
9. Why do you think accuracy is important in navigation?

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Choose a destination and, by using a starting point and several "stops" along the route, make up a navigation chart showing compass directions and distances to the mystery city you have chosen. Can your classmates or friends find your secret city?

MODULE 3, NUMBER 13 - NAVIGATION

Worksheet

Use Navigation Chart A to record compass readings of, and distances to, the five cities you have chosen. Navigation Chart B might be used for a similar activity in class (if time permits), or you could use it if you decide to try the Exploring on Your Own activity.

NAVIGATION CHART A

Cities	Compass Readings	Distances (in miles)
From: To:		
From: To:		
From: To		
From: To:		
From: To:		

NAVIGATION CHART B

Cities	Compass Readings	Distances (in miles)
From: To:		
From: To:		
From: To:		
From: To:		
From: To:		

MODULE 3, NUMBER 14 - POPULATION GROWTH

Teacher Activity Sheet

Overview

Your students will select five large cities from those listed on the Population Growth Information Sheet and make a double bar graph showing the population growth of these cities over a span of five, fifteen, or more years.

Math Skills Your Students Will Need

Making a double bar graph, making and interpreting charts, and rounding off large numbers.

Time Allotment

Two or three class periods.

Objectives

Your students will:

1. Read and make charts.
2. Round off large numbers to the nearest 10,000.
3. Construct a double bar graph from given information.

Materials Your Class Will Need

Population Growth Information Sheets (or almanacs giving up-to-date information), graph paper, pencils, and rulers.

Vocabulary

bar graph:	a diagram drawn to show the relationship between two or more numbers

Self-Concept Builder

Because your students will choose their own cities to work with, they will tend to take a more personal interest in this activity.

Activity

1. These activities work well when two students work together, but can be done individually if you and your students prefer.
2. Review the format and uses of bar graphs with your students.
3. Your students each select five cities that they would like to work with from the list on their Population Growth Information Sheets.
4. With your class, decide upon the time span they will use to find their cities' growth (5, 15, 25, etc., years).
5. Your students should, at this point, make a chart listing their five cities and their population for both years.
6. Your students then round off the population figures on their charts to the nearest 10,000 and decide upon the scale they will use for their bar graphs (making sure all of their population figures will fit on the graphs).
7. Students then construct their double bar graphs using the format you have decided upon.
8. Optional: Some of your students may want to compute the percentage of growth for each of their cities. Which city grew by the greatest percentage?

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

GOVERNMENT CENSUS TAKER

ALMANAC AUTHOR

ENCYCLOPEDIA AUTHOR

REAL ESTATE DEVELOPER

MARKETING PERSONNEL

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Get some information from your local city hall about your city's population growth over the years. Make a chart showing your city's population growth in 10- or 25-year intervals. Show your findings on a bar graph.

MODULE 3, NUMBER 14 - POPULATION GROWTH

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will see how cities grow, by making a bar graph.

Math Skills You Need to Remember

Making and interpreting a chart, rounding off large numbers, and making a double bar graph.

Things You Will Need

Population Growth Information Sheet, graph paper, a pencil, and a ruler.

Vocabulary

bar graph:	a diagram drawn to show the relationship between two or more numbers

When You Finish You Will Be Able To

Make a bar graph showing the population growth of five cities.

Activity

1. Using the information on your Population Growth Information Sheet, select five cities that you would like to work with.
2. After your teacher has reviewed with your class what bar graphs are, how they are made, and how they are used, help decide whether you will compare population growth for 5, 15, or more years.
3. Make a chart listing the five cities you have chosen and their population for the year spans you will use.
4. Round off each of your population figures to the nearest 10,000. Now decide what scale you will use on your bar graph that will fit all of your rounded-off numbers.
5. Construct a double bar graph on graph paper, using the form you and your teacher have decided upon. Make sure your bar graph has a title and that everything you've included on it is labeled correctly.

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Get some information from your local city hall about your city's population growth over the years. Make a chart showing your city's population growth in 10- or 25-year intervals. Show your findings on a bar graph.

HOW THE CITIES GREW

RANK	CITY	1975	1970	1960	1950	1900	1850	1790
1	New York, NY	7,481,613	7,895,563	7,781,984	7,891,957	3,437,202	696,115	49,401
	Bronx	1,355,482	1,471,701	1,424,815	1,451,277	200,507	8,032	1,781
	Brooklyn	2,408,234	2,602,012	2,627,319	2,738,175	1,166,582	138,882	4,495
	Manhattan	1,429,033	1,539,233	1,698,281	1,960,093	1,850,093	515,547	33,131
	Queens	1,963,705	1,987,174	1,809,578	1,550,849	152,999	18,593	6,159
	Staten Island	325,159	295,443	221,991	191,555	67,021	15,061	3,835
2	Chicago, IL	3,099,391	3,369,357	3,550,404	3,620,962	1,698,575	29,963	---
3	Los Angeles, CA	2,727,399	2,811,801	2,479,015	1,970,358	102,479	1,610	---
4	Philadelphia, PA	1,815,808	1,949,966	2,002,512	2,071,605	1,293,697	121,376	28,522
5	Detroit, MI	1,335,085	1,514,063	1,670,144	1,849,568	285,704	21,019	---
6	Houston, TX	1,326,809	1,253,479	938,219	596,163	44,633	2,396	---
7	Baltimore, MD	851,698	905,787	939,024	949,708	508,957	169,054	13,603
8	Dallas, TX	812,797	844,303	679,684	434,462	42,638	---	---
9	San Diego, CA	773,996	697,027	573,224	334,387	17,700	---	---
10	San Antonio, TX	733,248	708,582	587,718	408,442	53,321	3,488	---
11	Indianapolis, IN	725,077	740,000	476,258	427,173	169,164	8,091	---
12	Washington, DC	711,518	756,668	763,956	802,178	278,718	40,001	---
13	Honolulu, HA	705,381	630,528	294,194	248,034	39,306	---	---
14	Milwaukee, WI	665,796	717,372	741,324	637,392	285,315	20,061	---
15	Phoenix, AZ	664,721	589,016	439,170	106,818	5,544	---	---
16	San Francisco, CA	664,520	715,674	740,316	775,357	342,782	34,776	---
17	Memphis, TN	661,319	657,007	497,524	396,000	102,320	8,841	---
18	Cleveland, OH	638,793	750,879	876,050	914,808	381,768	17,034	---
19	Boston, MA	636,725	641,071	697,197	801,444	560,892	136,881	18,320
20	Jacksonville, FL	562,283	528,865	201,030	204,517	28,429	1,045	---
21	New Orleans, LA	559,770	593,471	627,525	570,445	287,104	116,375	---
22	San Jose, CA	555,707	461,212	204,196	95,280	21,500	---	---
23	Columbus, OH	535,610	540,025	471,316	375,901	125,560	17,832	---
24	St. Louis, MO	524,964	622,236	750,026	856,796	575,238	77,860	---
25	Seattle, WA	487,091	530,831	557,087	467,591	80,671	---	---
26	Denver, CO	484,531	514,678	493,887	415,786	133,859	---	---
27	Kansas City, MO	476,529	507,330	475,539	456,622	163,752	---	---
28	Pittsburgh, PA	458,651	520,089	604,332	676,806	321,616	46,601	---
29	Nashville-Davidson, TN	446,941	447,877	170,874	174,307	80,865	10,165	---
30	Atlanta, GA	436,057	495,039	487,455	331,314	89,872	2,572	---
31	Cincinnati, OH	412,564	453,514	502,550	503,998	325,902	115,435	---

RANK	CITY	1975	1970	1960	1950	1900	1850	1790
32	Buffalo, NY	407,160	462,768	532,759	580,132	352,387	42,261	---
33	El Paso, TX	385,691	322,261	276,687	130,435	15,906	---	---
34	Minneapolis, MN	378,112	434,400	482,872	521,718	202,718	---	---
35	Omaha, NE	371,455	358,452	301,598	251,117	102,555	---	---
36	Toledo, OH	367,650	383,062	318,003	303,616	131,822	3,829	---
37	Oklahoma City, OK	365,916	368,164	324,253	243,504	10,037	---	---
38	Miami, FL	365,082	334,859	291,688	249,276	1,681	---	---
39	Fort Worth, TX	358,364	393,455	356,263	278,778	26,688	---	---
40	Portland, OR	356,732	382,352	372,676	373,628	90,426	---	---
41	Newark, NJ	339,568	381,930	405,220	438,776	246,070	38,894	---
42	Louisville, KY	335,954	361,706	390,639	369,129	204,731	43,194	200
43	Long Beach, CA	335,602	361,427	344,168	250,767	2,252	---	---
44	Tulsa, OK	331,726	330,350	261,685	182,740	1,390	---	---
45	Oakland, CA	330,651	361,561	367,548	384,575	66,960	---	---
46	Austin, TX	301,147	255,869	186,545	132,459	22,258	629	---
47	Tucson, AZ	296,457	267,418	212,892	45,454	7,531	---	---
48	Baton Rouge, LA	294,394	271,922	152,419	125,629	11,269	3,905	---
49	Norfolk, VA	286,694	307,951	304,869	213,513	46,624	14,326	2,959
50	Charlotte, NC	281,417	274,640	201,564	134,042	18,091	1,065	---
51	Tampa, FL	280,340	277,714	274,970	124,681	15,839	---	---
52	St. Paul, MN	279,535	309,866	313,411	311,349	163,065	1,112	---
53	Albuquerque, NM	279,401	243,751	201,189	96,815	6,238	---	---
54	Birmingham, AL	276,273	305,893	340,887	326,037	38,415	---	---
55	Rochester, NY	267,173	295,011	318,611	332,488	162,608	36,403	---
56	Wichita, KS	264,901	276,554	254,698	168,279	24,671	---	---
57	Sacramento, CA	260,822	257,105	191,667	137,572	29,282	6,820	---
58	Akron, OH	251,747	275,425	290,351	274,605	42,728	3,266	---
59	Jersey City, NJ	243,756	260,350	276,101	299,017	206,433	6,856	---
60	St. Petersburg, FL	234,389	216,159	181,298	96,738	1,575	---	---
61	Richmond, VA	232,652	249,431	219,958	230,310	85,050	27,570	3,761
62	Corpus Christi, TX	214,838	204,525	167,690	108,287	4,703	---	---
63	Virginia Beach, VA	213,954	172,106	8,091	5,390	---	---	---
64	Dayton, OH	205,986	244,564	262,332	243,872	85,333	10,977	---

SOURCE: U.S. Bureau of the Census (cities over 100,000 ranked by 1975 population estimates). Excerpt from The World Almanac and Book of Facts: 1978 (New York: Newspaper Enterprise Association, 1978, p. 194). No population statistics are available for those items marked ---.

MODULE 3, NUMBER 15 - STOCK MARKET

Teacher Activity Sheet

Overview

Your students will develop an understanding of the stock market by following the daily stock market reports.

Math Skills Your Students Will Need

Working with fractions and percentages, dividing by decimals, and computing using money.

Time Allotment

Two class periods.

Objectives

Your students will:

1. Attain a basic understanding of the stock market.
2. Convert fractions to decimals.
3. Divide decimals.
4. Convert decimals to percentages.
5. Attain a better understanding of how fractions, decimals, and percentages are all related.

Materials Your Class Will Need

Two consecutive days' newspapers, paper, and pencils.

Vocabulary

stock market report:	the section of a newspaper reporting the progress of sales and prices of stocks
stock:	the capital or money that a corporation raises through the sale of shares entitling the holder to dividends and to other rights of ownership
share:	the smallest item of ownership of a corporation that can be bought and sold by an investor

investor:	a person who invests money
stockbroker:	a person who buys and sells stocks and bonds for others for a commission or fee
close:	the price at which the market closed at the end of the day's trading
net chg. [change]:	the amount of change over a day, which determines the new closing price of a stock

Self-Concept Builder

Since each student chooses his or her own stocks, there is no single set of correct answers for the class. Students won't be afraid of failure, because everyone's answers will be different.

Activity

1. Explain to your class what stocks are and that the stock exchange is a place to buy and sell stocks.
2. Let your students look over the pages of the stock market report in the newspaper. Direct their attention to the "Close" and "Net Chg." columns next to the name of each stock. Close means the price at which the stock closed at the end of the market day. Notice that this item is listed in mixed numbers. The fraction means the fraction of a dollar (1/8 = .125 cents). Stocks are usually bought in even-number groups so they come out to whole cents, but if not, they are rounded to the nearest cent. Net Chg. means change of the stock price since yesterday (+1/4) means that the stock cost went up 25 cents that day; -1/4 means that it dropped 25 cents). For example, if the stock listing for a particular stock says

Close	Chg.
22 1/8	+1/4

    it means the price of the stock closed at $22.125 the day before (if you're using a morning paper) and went up 25 cents since yesterday's opening price of $21.875 per share ($21.875 + .25 = $22.125).
3. With your class, go over the example on the Student Activity Sheets. Make sure each student understands the mathematical calculations involved.

Example:

	Wednesday's Newspaper		Thursday's Newspaper		
	Close	Chg.		Close	Chg.
VOP	2 3/4	-1/8	VOP	2 3/8	-3/8

Both days' results on the stock are shown. To compute the percentage or rise or fall of the stock, look at the last day's change (in this case, Thursday's Chg. is -3/8), and convert this figure to a decimal numeral.

```
          .375
3/8 = 8 ) 3.000          (down .375)
          2 4
          ---
           60
           56
           --
            40
            40
```

Also, convert yesterday's closing price to its decimal equivalent (Wednesday's close = 2 3/4 = 2.75). With this information, set up a percentage equation:

What percent of 2.75 is .375?

$n \times 2.75 = .375$

$n = .375 \div 2.75$

$n = ?$

```
          .136         ≐ 13.6 percent  (≐ means approximately equal to)
2.75 ).37.500
       27 5
       -----
       10 00
        8 25
       -----
        1 750
        1 650
        -----
          100
```

Therefore, the percentage of change is down 13.6 percent, or a -13.6 percent change.

4. Group your students in pairs and let them look over the pages of the stock market report in the newspaper. Have each pair pick out five stocks and record the needed information (first day close and change, second day close and change, percentage change) on their Activity Sheets.

5. How many of your students chose stocks that gained over the day? Did those stocks that cost the most make more significant changes than those that cost very little? How do your students account for this difference?

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

STOCKBROKER

OPTIONS TRADER

INVESTMENT AGENT

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that men and women can be equally successful in most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

Follow the stock market over a period of a week or two. Record the closing price and change of each of the stocks you want to follow. How much would you gain or lose if you sold your stocks at the end of the second week, assuming you bought 100 shares of each?

MODULE 3, NUMBER 15 - STOCK MARKET

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will discover how to read the stock market report in the newspaper.

Math Skills You Need to Remember

Working with fractions and percentages, dividing by decimals, and computing using money.

Things You Will Need

Two consecutive days' newspapers, paper, and a pencil.

Vocabulary

stock market report:	the section of a newspaper reporting the progress of sales and prices of stocks
stock:	the capital or money that a corporation raises through the sale of shares entitling the holder to dividends and to other rights of ownership
share:	the smallest item of ownership of a corporation that can be bought and sold by an investor
investor:	a person who invests money
stockbroker:	a person who buys and sells stocks and bonds for others for a commission or fee
close:	the price at which the stock closed at the end of the day's trading
net chg. [change]:	the amount of change over a day, which determines the new closing price of a stock

When You Finish You Will Be Able To

Determine how much any stock has gained or lost in price on the stock market on any given day.

Activity

1. Your teacher will explain and discuss with your class what the stock market is and what the last two columns of numbers mean under Close and Net Chg. in the newspaper stock market report.
2. With your teacher, examine the following example on how to calculate the percentage increase or percentage decrease of stock.

Example:

	Wednesday's Newspaper			Thursday's Newspaper	
	Close	Chg.		Close	Chg.
VOP	2 3/4	-1/8	VOP	2 3/8	-3/8

Both days' results on the stock are shown. To compute the percentage of rise or fall of the stock, look at the last day's change (in this case, Thursday's Chg. is -3/8), and convert this figure to a decimal numeral.

```
            .375
3/8 = 8  )3.000            (down .375)
          2 4
           60
           56
            40
            40
             0
```

Also, convert yesterday's closing price to its decimal equivalent (in this case, Wednesday's close = 2 3/4).

```
            .75
3/4 = 4  )3.00             2 3/4 = 2.75
          2 8
           20
           20
            0
```

With this information, set up a percentage equation.

What percent of 2.75 is .375?

$n \times 2.75 = .375$

$n = .375 \div 2.75$

$n = ?$

```
          .136        ≑ 13.6 percent   (≑ means approximately equal to)
2.75 ).37.500
        27 5
        10 00
         8 25
         1 750
         1 650
           100
```

Therefore, the percentage of change is down 13.6 percent, or a -13.6 percent change.

3. In groups of two, choose five names of stocks and fill in the following information:

a. Stock Name ______________________________

First Day Second Day

Close Chg. Close Chg.

_____ _____ _____ _____

Percentage change ____________

b. Stock Name ______________________________

First Day Second Day

Close Chg. Close Chg.

_____ _____ _____ _____

Percentage change ____________

c. Stock Name ______________________________

First Day		Second Day	
Close	Chg.	Close	Chg.
_____	_____	_____	_____

Percentage change ____________

d. Stock Name ______________________________

First Day		Second Day	
Close	Chg.	Close	Chg.
_____	_____	_____	_____

Percentage change ____________

e. Stock Name ______________________________

First Day		Second Day	
Close	Chg.	Close	Chg.
_____	_____	_____	_____

Percentage change ____________

4. Did the stocks that cost the most make the biggest percentage change? Why or why not? ______________________________
____
____
____

5. Choose one of your stocks that increased or decreased the most. Assume you invested in 100 shares of those stocks on the first day. How much did you gain or lose on the next day?
____

6. Out of the five stocks you chose, assume you bought 100 shares of each. If you sold them all the next day, would you have made a profit? ______________________________

How much did you gain or lose? ______________________
____

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which you are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

Follow the stock market over a period of a week or two. Record the closing price and change of each of the stocks you want to follow. How much would you gain or lose if you sold your stocks at the end of the second week, assuming you bought 100 shares of each?

MODULE 3, NUMBER 16 - SHOPPING AT THE STOCK MARKET

Teacher Activity Sheet

Overview

After choosing two to four different stocks, your students will follow their progress in the daily stock market reports and compute and graph their progress for two weeks. This activity should be preceded by Activity 15.

Math Skills Your Students Will Need

Understanding of fractions, making a chart, making a graph, computing with money, and working with negative and positive numbers.

Time Allotment

Two weeks, but only partial periods to record and graph the progress of stocks.

Objectives

Your students will:

1. Gain a basic understanding of the stock market.
2. Compute fractions of a dollar.
3. Make a chart.
4. Use a chart to make a line graph.

Materials Your Class Will Need

Your class will need a daily newspaper (with stock market report) for ten days. Each student will need the MATHCO Stock Chart (on the Shopping at the Stock Market Worksheet), graph paper, paper, and a pencil.

Vocabulary

stock market report:	the section of a newspaper reporting the daily transactions in stocks
share:	the smallest item of ownership of a corporation that can be bought and sold by an investor

Self-Concept Builder

Since each student chooses his or her own stocks and luck is involved, there is no class pressure to have a single right answer. Instead, your students will take a personal interest in the project and by repeating the same calculation process daily for two weeks, have a better chance of being successful.

Activity

1. Using the stock market report in the newspaper, have your students choose two to four stocks in which they can invest, "$1,000 in each stock. Have them fill in their Stock Charts with the correct information needed for each stock purchased.
2. For two weeks, your students will record the change and closing price of each of their stocks on their Stock Charts. Using the information from the chart, have each student draw a line graph to show his or her stocks' progress. Each stock should be graphed on a separate sheet of graph paper, unless colored pencils are used to designate the different stocks.
3. At the end of the two weeks, have each student compute the loss or gain on his or her investment by "selling" the stock. They will use the closing prices to compute their final selling prices for the two weeks. Again, they will fill in this information for each stock on their charts.
4. With your class, determine which student "made" the most money by investing wisely in productive stock.
5. With your class, determine which stock had the largest change (rise and/or decline).
6. Your students will fill in the blanks on their Activity Sheets for the following:

   Compute the total amount of money you made. ______________

   Who in your class made the most money? ________________

   Which of your stocks rose the most? ____________________

   What was the change? ______________________________

   Which of your stocks declined the most? ________________

   What was the change? ______________________________

   In your class, whose stocks rose the most? ______________

   In your class, whose stocks declined the most? ___________
7. Make a display of some of your students' graphs on a bulletin board so other students can compare them with their own graphs.

Occupations Related to This Activity

What occupations might use an activity similar to this one? Have your students complete the career section on their Activity Sheets. After class discussion, they should add these occupations to the list:

STOCKBROKER

OPTIONS TRADER

INVESTMENT AGENT

Discuss the kinds of courses people going into these occupations should take in high school. Have your students add these courses to their Activity Sheets.

Stress that women and men can be equally successful at most careers, if they are qualified.

Suggested Independent Activities

(These suggestions appear on Student Activity Sheets.)

1. Using a set amount of money, "invest" as much as you'd like in stocks of your choice. You may sell and buy new ones when you like, but try to earn money on each investment. On a predetermined day, sell all of your stocks and compute how much money you "made" or "lost." Which of your stocks rose in value? Which declined?
2. Research some stocks that interest you. Follow their progress.

MODULE 3, NUMBER 16 - SHOPPING AT THE STOCK MARKET

Student Activity Sheet

Your Name ______________________________ Date ____________

Overview

In this activity, you will "invest" in stocks of your choice and after two weeks, you will determine how much money you have "made."

Math Skills You Need to Remember

Understanding fractions, making a chart, making a graph, computing with money, and working with negative and positive numbers.

Things You Will Need

Your class will need a daily newspaper (with stock market report) for ten days. You will need the MATHCO Stock Chart (on the Shopping at the Stock Market Worksheet), graph paper, paper, and a pencil.

Vocabulary

stock market report:	the section of a newspaper reporting the daily transactions in stocks
share:	the smallest item of ownership of a corporation that can be bought and sold by an investor

When You Finish You Will Be Able To

Follow the progress of the stocks of your choice to see if they earn or lose money.

Activity

1. Choose two to four stocks from the stock market report in the newspaper. "Invest" $1,000 in each of your choices and determine the number of shares you can buy of each stock for $1,000. Fill in the appropriate information in the chart on your Worksheet for each stock purchased.

2. For two weeks, record the changes and closing prices of each of your stocks. Using the information on your chart, draw a line graph to show each stock's daily closing price. Each stock should be graphed on a separate sheet of graph paper unless you use colored pencils to designate the different stocks.
3. At the end of two weeks, compute the loss or gain on each of your stocks. Use the new closing prices to determine what each stock is now worth. Did you gain or lose money? Fill in the chart with the amount of money received for each stock after two weeks.
4. Compute the total amount of money you made.

   ____

5. Who in your class made the most money?

   ____

6. Which of your stocks rose the most? ______________

   What was the change? ______________

7. Which of your stocks declined the most? ______________

   What was the change? ______________

8. In your class, which stock rose the most?

   ____

9. In your class, which stock declined the most?

   ____

Occupations Related to This Activity

(You may check the MATHCO Career Wall Charts to get more information about a career in which are interested.)

OCCUPATIONS	SUBJECTS NEEDED IN HIGH SCHOOL
______________	______________
______________	______________
______________	______________
______________	______________
______________	______________
______________	______________

Are you interested in any of these careers? Remember, you can be anything you want to be--if you are qualified.

Women and men can do the same jobs with equal success. Can't both men and women enter each of the occupations you've listed above?

Exploring on Your Own

1. Using a set amount of money, "invest" as much as you'd like in stocks of your choice. You may sell and buy new ones when you like, but try to earn money on each investment. On a predetermined day, sell all your stocks and compute how much money you have "made" or "lost." Which of your stocks rose in value? Which declined?
2. Research some stocks that interest you. Follow their progress.

MATHCO STOCK CHART

Name of Stock #1	Price per Share	Number of Shares Bought	Amount Paid	Amount Received after Two Weeks	Cash Balance

Closing Prices
of Stock #1
for 10 days

1st day: $ ________

2nd day: $ ________

3rd day: $ ________

4th day: $ ________

5th day: $ ________

6th day: $ ________

7th day: $ ________

8th day: $ ________

9th day: $ ________

10th day: $ ________

Name of Stock #2	Price per Share	Number of Shares Bought	Amount Paid	Amount Received after Two Weeks	Cash Balance

Closing Prices
of Stock #2
for 10 days

1st day: $ ________

2nd day: $ ________

3rd day: $ ________

4th day: $ ________

5th day: $ ________

6th day: $ ________

7th day: $ ________

8th day: $ ________

9th day: $ ________

10th day: $ ________

MATHCO STOCK CHART

Name of Stock #3	Price per Share	Number of Shares Bought	Amount Paid	Amount Received after Two Weeks	Cash Balance

Closing Prices
of Stock #3
for 10 days

1st day: $ ______
2nd day: $ ______
3rd day: $ ______
4th day: $ ______
5th day: $ ______
6th day: $ ______
7th day: $ ______
8th day: $ ______
9th day: $ ______
10th day: $ ______

Name of Stock #4	Price per Share	Number of Shares Bought	Amount Paid	Amount Received after Two Weeks	Cash Balance

Closing Prices
of Stock #4
for 10 days

1st day: $ ______
2nd day: $ ______
3rd day: $ ______
4th day: $ ______
5th day: $ ______
6th day: $ ______
7th day: $ ______
8th day: $ ______
9th day: $ ______
10th day: $ ______